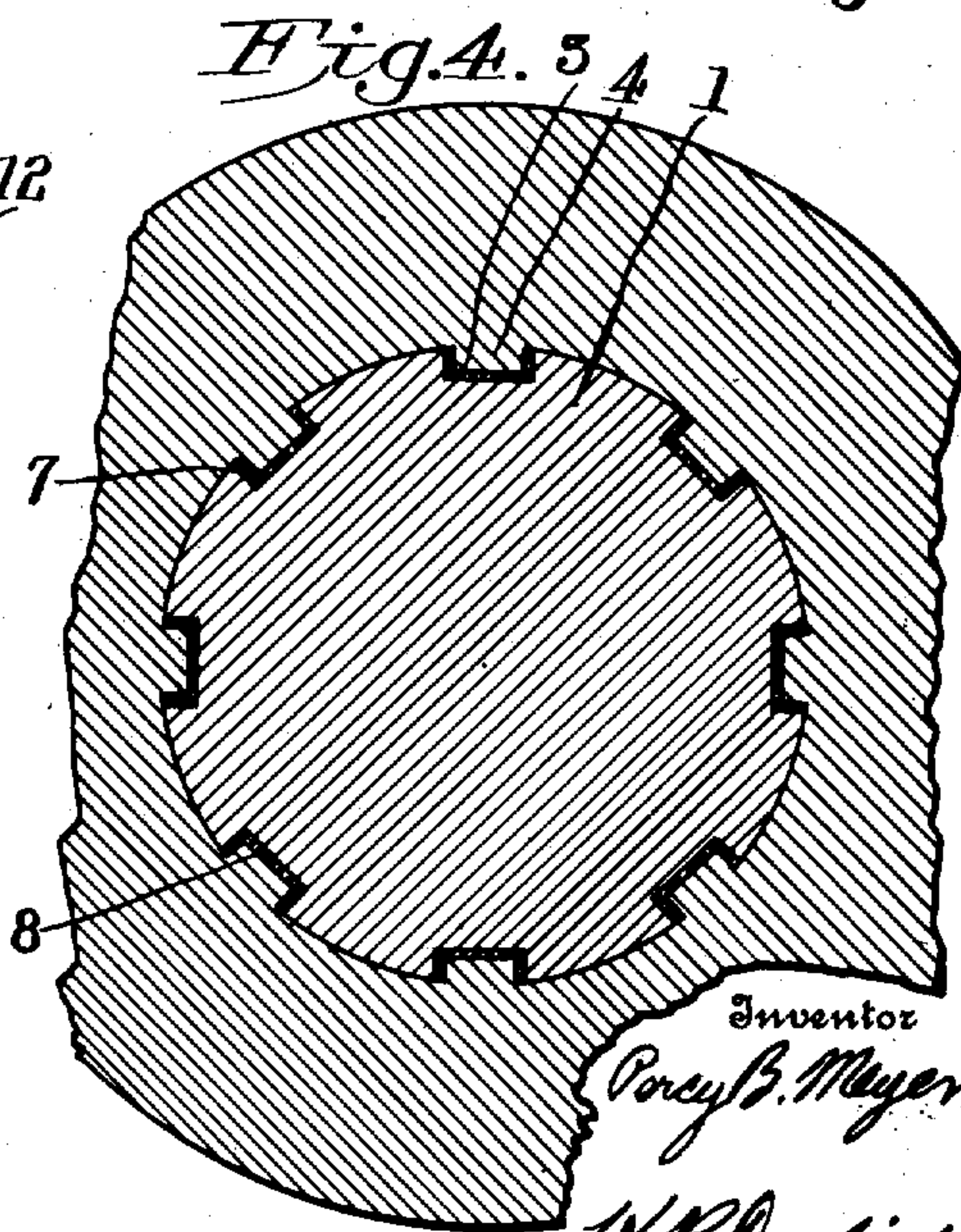
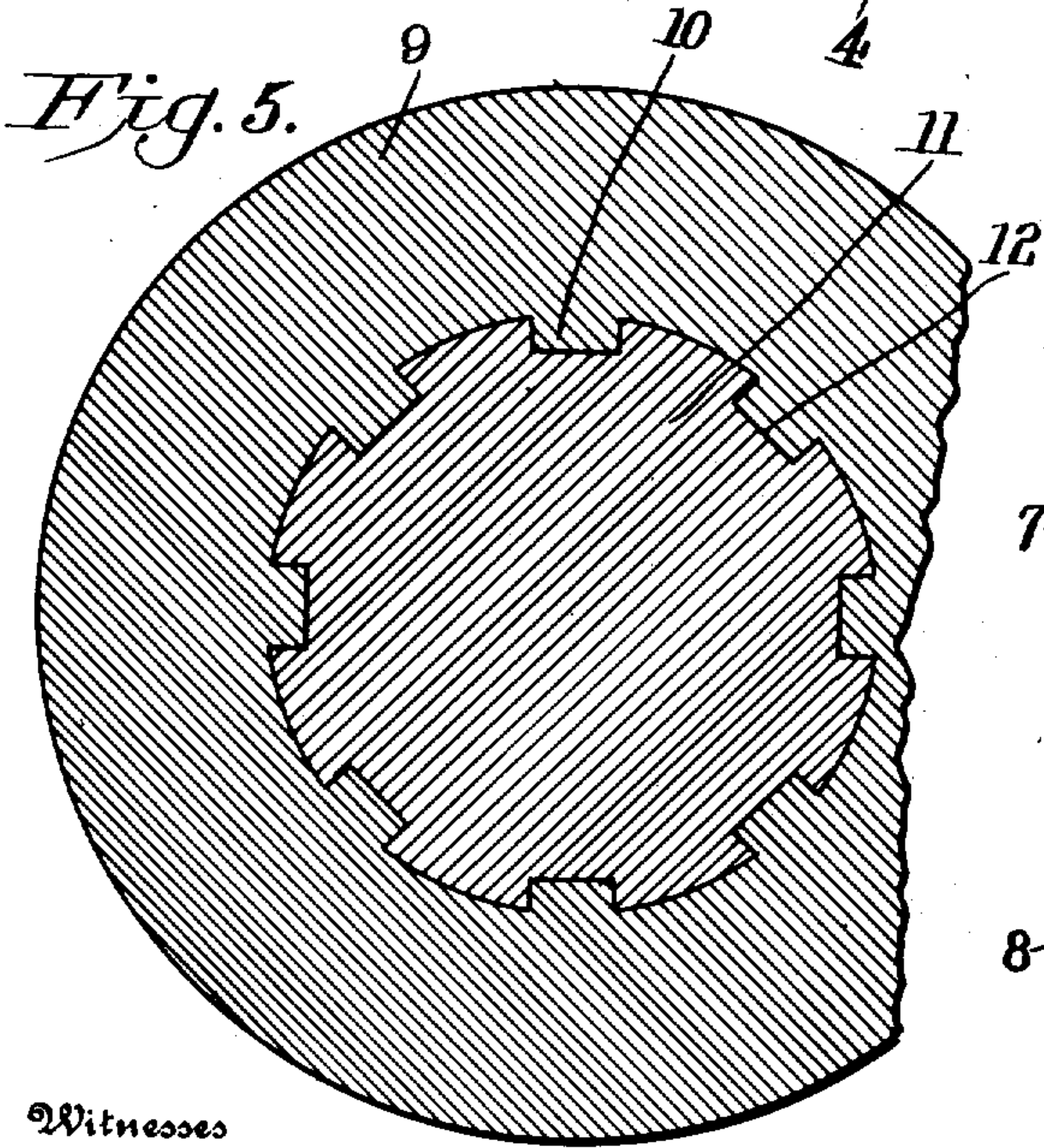
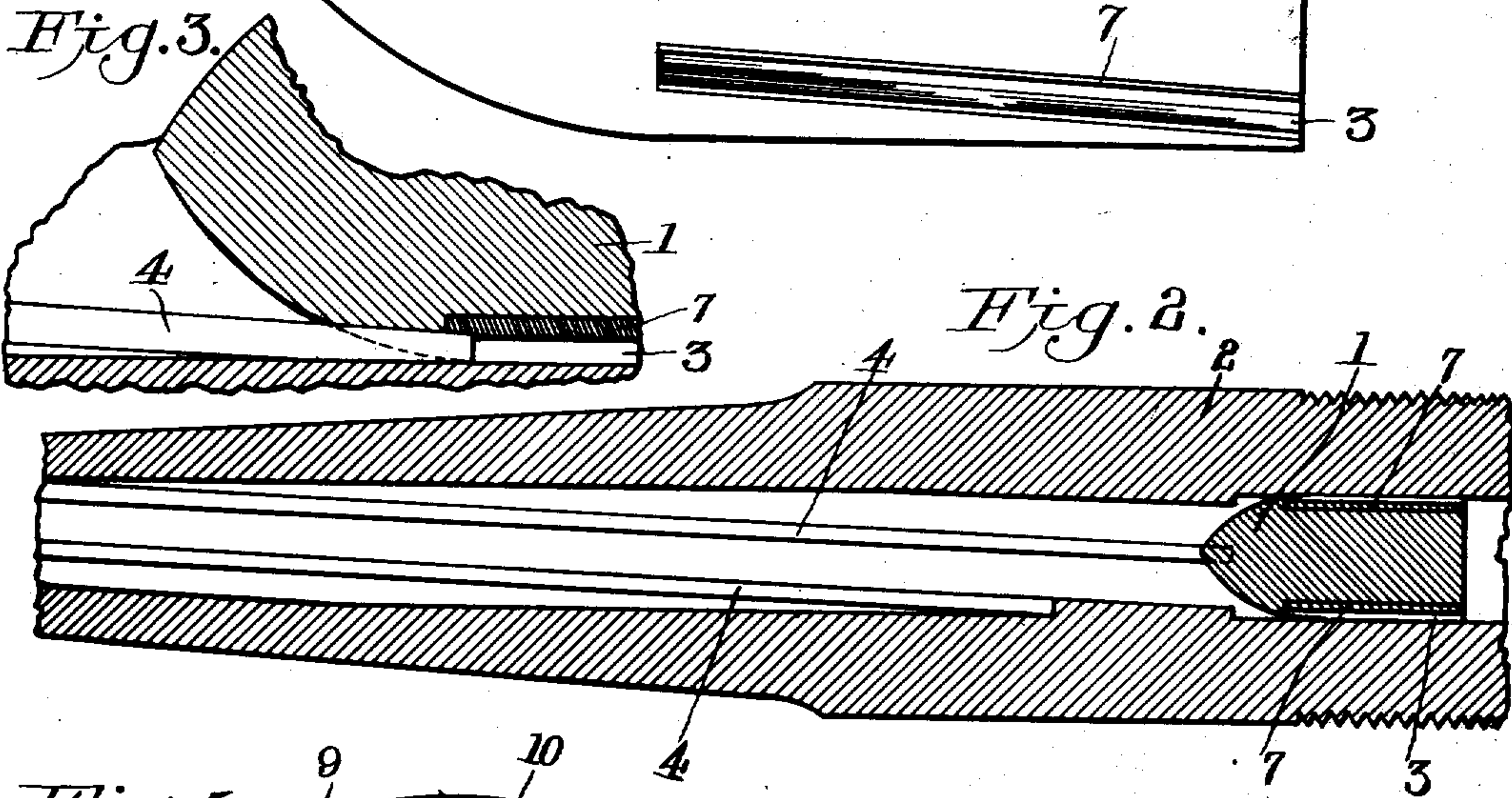
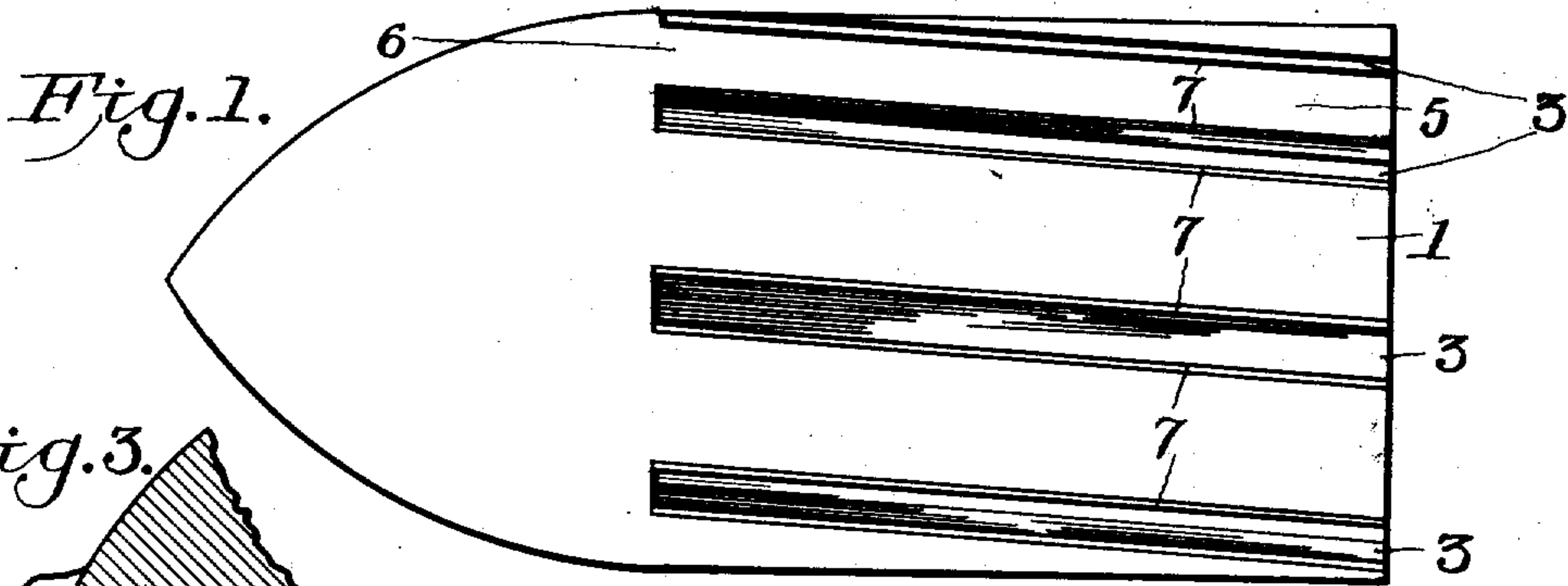


P. B. MEYER.  
PROJECTILE FOR RIFLED GUNS.  
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910,935.

Patented Jan. 26, 1909.



Witnesses

*W. E. Jones Jr.*  
*James H. Blacklock*

364

Inventor

*Percy B. Meyer*

*H. P. Rordale*

Attorney



# UNITED STATES PATENT OFFICE.

PERCY B. MEYER, OF SHREVEPORT, LOUISIANA.

## PROJECTILE FOR RIFLED GUNS.

No. 910,935.

Specification of Letters Patent.

Patented Jan. 26, 1909.

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*To all whom it may concern:*

Be it known that I, PERCY B. MEYER, a citizen of the United States, residing at Shreveport, in the parish of Caddo and State of Louisiana, have invented certain new and useful Improvements in Projectiles for Rifled Guns, of which the following is a specification.

My invention relates to projectiles for rifled ordnance and its object is to provide means to prevent the erosion of the barrel of the gun by the passage of flame and gases between the projectile and the bore of the gun.

I am aware that it has been heretofore proposed to provide a gas check against the passage of the flame and gases between the projectile and gun by means of a band or ring of ductile metal carried by the projectile in addition to the usual rifle motion imparting band and adapted to be forced into engagement with the rifling grooves in the gun, so as to close such grooves immediately upon the explosion of the charge. But to the best of my knowledge, such constructions have not been successful in attaining the end desired, and this result is due principally, I believe, to the fact that upon the explosion of the charge, the projectile must travel in the bore of the gun a distance nearly equal to its length before the gas check ring, situated at the butt end of the projectile, engages the rifled grooves in the gun, thus permitting the flame and gases during such interval to escape past the ring and pass between the surface of the projectile and the bore of the gun, to the consequent erosion of the bore. There is objection also to the small circumferential band now employed either when used singly as both the rotary motion imparting member and gas check, or when used in pairs to effect these two objects, due to the danger of these bands, owing to their size, being melted or stripped before the rifle motion is given to the projectile and their failure to properly engage the grooves in a gun whose bore is eroded from previous firings, whereby both the proper rifle motion of the projectile is lost, and also there results a great loss of velocity on account of windage. My invention aims to overcome this difficulty and to this end provides means whereby immediately upon the explosion of the charge and at the beginning of the forward movement of the projectile, a gas sealing engagement between the lands of the gun and corresponding grooves cut in the projectile is effected so

that the passage of flame and gases between the projectile and bore of the gun is prevented.

In carrying out my invention, it is embodied in preferable form in the device hereinafter described and illustrated in the accompanying drawings.

In these drawings, Figure 1 is a plan view of a projectile containing my improvements; 65 Fig. 2 is a longitudinal section of a gun and a projectile seated in the bore of the gun and ready for firing; Fig. 3, an enlarged detail view similar to Fig. 2; Fig. 4, a cross section through projectile and gun, and Fig. 5, a 70 view similar to Fig. 4, of a modification.

Referring to the drawings and particularly to Figs. 1 to 4, 1 is an elongated projectile of usual form adapted to be loaded at the breech of a gun 2. Formed in this projectile 75 and extending helically and longitudinally thereof, are rifle grooves 3, which are adapted to engage the rifle lands 4 of the gun. Of course it will be understood that in modern ordnance the rifle lands and grooves in the 80 bore of the gun are slight in depth and very numerous, but in order to render more intelligible my invention, I have shown the lands 4 in the bore of the gun and the engaging grooves 3 of the projectile as few in number and as greatly exaggerated in size. The 85 grooves 3 extend at the same pitch as the lands in the bore and serve by their engagement with the lands to give the rotatory, rifle motion to the projectile. These grooves 90 are so formed that at the same time they perform the main function of my invention, namely, of providing a close sealing contact between the projectile and gun which takes place from the very instant of firing, and 95 which is effected along the entire length of that part of the projectile of maximum diameter. To accomplish these purposes the grooves 3 extend from the base of the projectile along the portion 5, of maximum and 100 uniform diameter, substantially to the limit of such portion, at 6, where the shell begins to taper off to the point. By this arrangement, when the projectile is in the firing chamber, as shown in Fig. 2, the grooves are 105 separated only by a very short space, say for about an inch, from the ends of the lands, so that immediately upon the explosion of the charge, and initial forward impulse of the projectile the lands of the gun will take into 110 the grooves, as shown in Fig. 3. The sealing contact heretofore spoken of is obtained



by the close and tight interfitting of the grooves and lands, so that the passage will be closed practically air-tight against the escape of flame and gas. In the case of guns of small caliber such closure may be obtained as will be hereafter referred to, by the exact mechanical interfitting of the steel lands within the steel grooves, but in the case of larger ordnance where the pressure is very heavy and transverse strain on the lands is excessive, I provide a lining of yielding or ductile metal in the grooves, which not only yields to the pressure of the lands so as to avoid danger of stripping the latter from the gun but also forms a tightly sealing medium in the grooves between the surface thereof and the lands of the gun. This lining is preferably of copper and is designated by 7. It may be secured in the groove in any suitable manner. In small guns, a filling or lining of some plastic, non-metallic composition may be employed, if desired.

In Fig. 2, the projectile is shown in the gun before the charge is fired and in the enlarged detail of Fig. 3, it is shown as just beginning its engagement with the lands of the gun, one of these lands being shown as embedded in the copper lining 7. In Fig. 4, the dotted lines 8 represent the edges of the lands, showing the extent of projection of the lands into the copper. As soon as such engagement of the lands and grooves takes place, the copper is compressed by the lands and spreads out, completely closing the bore of the gun and preventing the passage of the gas and flame from the powder chamber over the surface of the projectile and against the inner surface of the bore. As the projectile continues its movement it will be given the proper rotating motion by such engagement of the grooves and lands. The immediate closure of the bore also prevents the melting of the copper and the long bearing surface obtained by the continuous lining on the part of the projectile in contact with the bore insures the proper engagement of the grooves with the lands so as to obtain both the closing action and rifle motion, even with guns previously somewhat eroded. By thus insuring the closing of the bore, not only is erosion prevented but also the loss of velocity due to windage.

In Fig. 5, a gun 9 is shown having lands 10 in which gun fits a projectile 11, having helical grooves 12, to engage the lands. In this form, which may be used for guns of smaller caliber and of less pressure, the grooves are

cut directly in the steel or iron of the projectile and obtain the closing action merely by their close mechanical fit with the lands, such fit being expressly made tight enough to exclude the passage of gas and flame.

It is clear that some changes in the material of the lining of the projectile shown in Figs. 1 to 4 may be made and various methods of securing such lining in place adopted and other minor changes in detail made without departing from the principle of my invention.

Having thus described my invention, what I claim is:—

1. A projectile for rifled guns having helical grooves extending longitudinally of the projectile and adapted to engage the lands of the gun and having therein linings of softer material than the gun and providing grooves of less depth than the lands of the gun, substantially as described.

2. A projectile for rifled guns having helical land-engaging grooves extending longitudinally of the projectile and having a soft metal lining therein, forming grooves of less depth than the lands of the gun, in which lining the lands of the gun are adapted to be embedded, substantially as described.

3. A projectile for rifled guns having land-engaging grooves extending longitudinally of the projectile and for the entire length of the part thereof of maximum diameter, said grooves being lined with soft metal providing grooves of less depth than the lands of the gun, in which lining the lands of the gun become embedded, substantially as described.

4. In a combination with a rifled gun, a projectile therefor having helical land-engaging grooves extending throughout the length of the part of the projectile of maximum diameter, said grooves having a soft lining of sufficient thickness to form grooves of less depth than the lands of the gun so that the lining will be compressed and the lands be embedded therein when the lands enter the grooves, whereby the grooves and lands impart a rotary movement to the projectile and are tightly sealed against the passage of gas and flame between the projectile and bore of the gun, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

PERCY B. MEYER.

Witnesses:

JOS. H. BLACKWOOD,  
H. P. DOOLITTLE.