

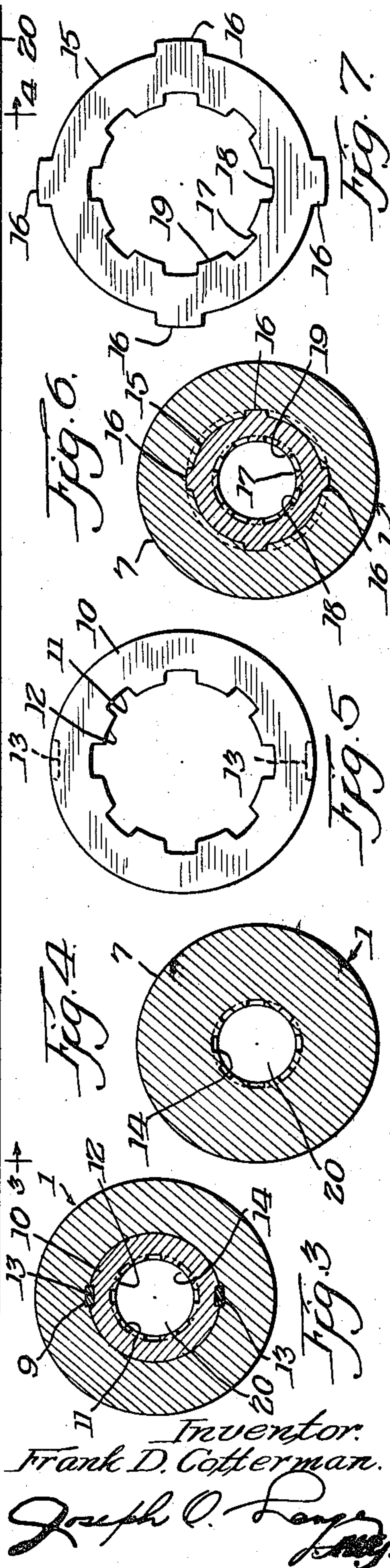
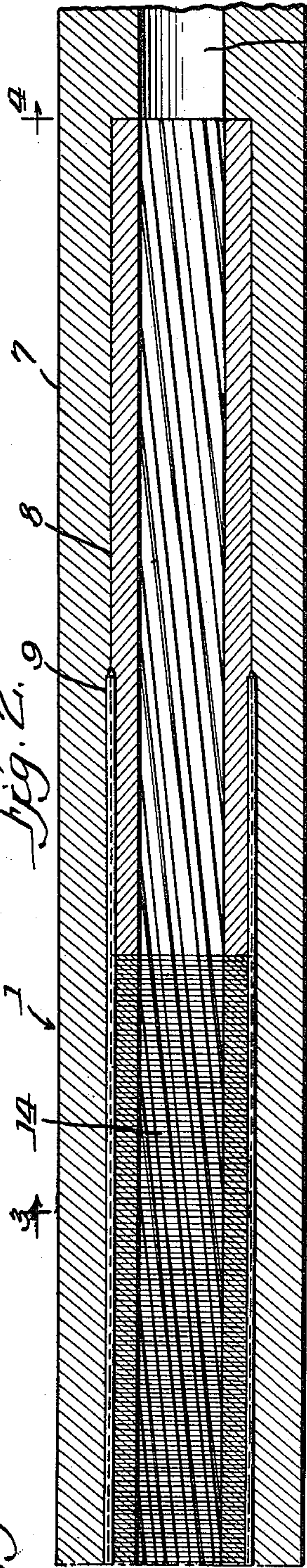
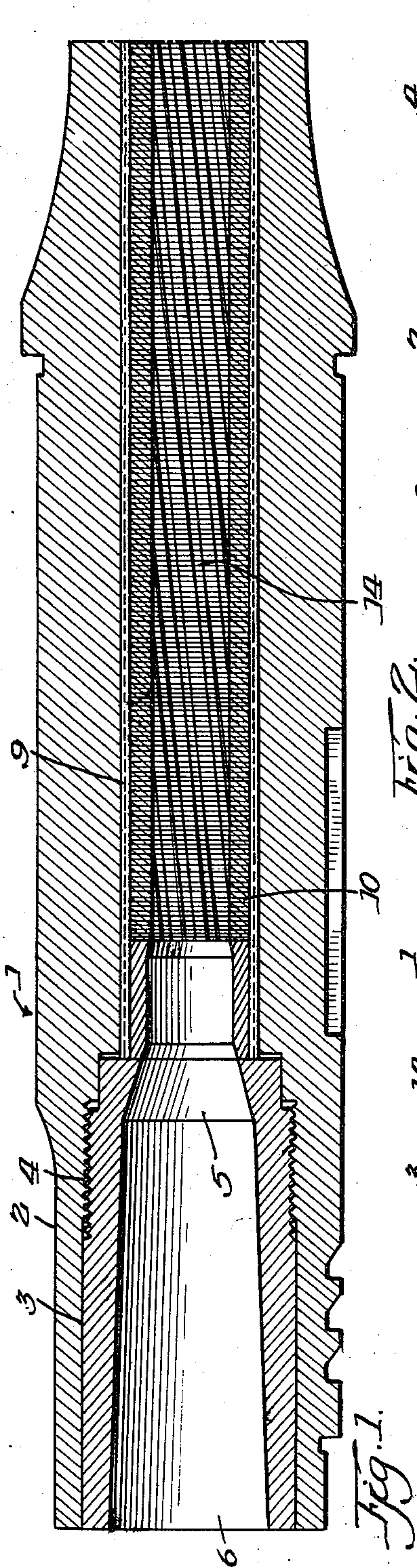
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GUN BARREL LINER

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GUN BARREL LINER

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5 Claims. (Cl. 89—16)

This invention relates to improvements in a gun barrel or the like, and, more particularly, it is concerned with a novel liner therefor.

Heretofore, in connection with the manufacture of gun barrels of certain special materials, for example, it has been difficult to obtain such special materials in the form required for best performance in ultimate use. Specifically, for example, it has been relatively difficult and costly to obtain a molybdenum barrel made integrally with the usual rifling required. Similarly, the construction of an inner liner integrally made and formed of molybdenum or other special materials has also been difficult and relatively costly.

Therefore, it is one of the more important objects of this invention to provide a gun liner formed from a series of identical washers stamped from desired sheet material, and which are assembled and accurately aligned axially, with the lands and the grooves formed comprising the rifling formed in each washer preferably during the stamping operation.

Other objects and advantages of the invention will become more readily apparent upon proceeding with the description of a preferred form of the device read in light of the accompanying drawings, in which

Fig. 1 is a fragmentary sectional assembly view of the breach end of a gun barrel embodying my invention.

Fig. 2 is a fragmentary sectional assembly view of the forward end of a gun barrel embodying my invention.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a plan view of a preferred form of washer.

Fig. 6 is a transverse sectional assembly view employing a modified form of washer.

Fig. 7 is a plan view of a modified form of washer.

Similar reference numerals refer to similar parts throughout the several views.

Referring to the drawings, particularly Fig. 1, the gun barrel generally designated 1 is shown having at the breach end 2 a suitable bushing 3 threadedly attached thereto as at 4 and apertured as at 5 with the usual receiving end portion 6 which may be suitably formed as determined by the nature of the service for which the gun barrel is intended to be used. As shown more clearly in Fig. 2 at the forward end 7 of the barrel 1 it is provided with a second bushing 8, non-rotatably received as at key 9 and the outlet 20. Applied in snug face to face assembly between the respective bushing 3 at the breach end and the bushing 8 at the forward end of the barrel respectively, the identical washers 10 having the form shown in plan in Fig. 5 are positioned. These washers are preferably stamped with the rifling grooves 11 and the lands 12. The outer grooves 13 are subsequently located in each washer periphery after assembly, so that the lands 12 and grooves 11 form the desired rifling continuous extending transversely through each washer to form the general configuration of rifling shown at 14 in Figs. 1

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and 2. Initially, they are preferably fitted upon a mandrel (not shown) suitably rifled to receive the washers 10 and the slots 13 are then machined for the key 9.

In the modified form shown in Figs. 6 and 7, each of these washers 15 is also identical in shape and preferably provided with the outer annularly spaced projections 16 for engagement with similar spaced rifling grooves (not shown) within the gun barrel. Thus, this insures the proper position rotatively of each of the washers relative to each other to form the rifling desired. In this modification, each of the washers snugly fits the rifled grooves of the gun barrel, the grooves of the barrel having the same twist and spacing as the rifling desired. Thus, the washers when placed in the barrel rifled groove with the lugs 16 engaging the barrel rifling will then be oriented so that the normal rifling will appear in the liner bore produced by the assembled washers with only slight steps between each washer. It will, of course, be apparent that these washers may be stamped, if desired, so that the edges of the lands 14 will have a proper slope in each washer to minimize the sharp step arrangement normally formed by the corners 17 of the rifling grooves 18 and the lands 19.

It will also be apparent that the lands 19, the grooves 18 and projections 16 may be formed on the modified washers 15 during the stamping operation.

In summary, it should be understood that the rifling in the assembly liner washers is formed by properly orienting the washers relative to each other either by assembling the washers on an externally rifled mandrel (not shown) and then machining one or more straight longitudinal grooves for keys 9 which mate with the corresponding grooves in the barrel recess, or else each washer may be stamped with one or more lugs 16 extending from the outer circumference and then completing the assembly with the gun barrel by cutting spiral grooves therewithin having the same twist as the rifling within the barrel recess. The washers are then inserted in the barrel recess so that the lugs engage the spiral grooves with the washers in the desired position rotatively.

In considering this invention, it will, of course, be appreciated that by means of such assembly, a composite liner has been provided having in addition to other desirable properties great strength and yet satisfactory ductility to resist the internal forces created by firing pressures. In the latter connection, it should be noted that it has been found that the longitudinal cracking of liners due to the exertion of such forces are detrimental because erosion tends to localize in the cracking formed and to wash out the liner material or the steel beneath it. Transverse cracks on the other hand can usually be tolerated.

While I have shown only two forms of the invention, it will be clear that other forms may be used without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. In a gun barrel and liner, the combination of a liner formed by the assembly of a plurality of washers in abutting face to face relation, the said washers being pre-rifled and having outer projecting portions for engagement with suitably formed interior surfaces of the said barrel, the inner peripheral edges of the washers being formed with grooves and lands therebetween to create when assembled a rifled path extending transversely continuously through each washer for a projectile, and means cooperating with the barrel for retaining said washers in said face to face relation and in predetermined non-rotatable position relative to each other.

2. In a gun barrel and liner, the combination of a liner comprising a plurality of pre-rifled washers assembled in abutting face to face relation, the washers having outer

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portions for engagement with the interior of the said barrel to hold the washers against relative rotation, inner peripheral surface portions of the washers being relieved to produce when assembled a continuous interconnected rifled path for a projectile, the interior of said gun barrel also defining the relative rotative position of the said washers to each other.

3. A gun barrel and liner combination, the liner being comprised of a plurality of pre-rifled washers transversely extending in abutting face to face relation within the barrel, the washers having plain outer surfaces with suitably formed portions guided by an interior portion of the said barrel, the inner surfaces of the washers being formed with predeterminedly relieved portions to provide when assembled a continuous rifled passage for a projectile, and means cooperating with the gun barrel to hold the said washers against end movement.

4. A gun barrel and liner combination, the liner being formed with a plurality of pre-rifled washers in abutting face to face relation, the washers having outer portions for engagement with the said barrel, the inner edges of the washers being relieved to provide transversely extend-

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ing openings and forming when assembled a rifled path for a projectile, the gun barrel having inner annularly positioned means cooperating with said washers to define the fixed position of the washers relative to the said barrel and to each other.

5. A gun barrel and liner combination, the liner comprising a plurality of preformed washers in abutting face to face relation, the said washers being engageable with the said barrel and having suitably shaped inner peripheries forming when assembled rifled means for a projectile, the said gun barrel cooperating with said washers to define the extent of said rifled means and the relative rotative position of said washers.

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