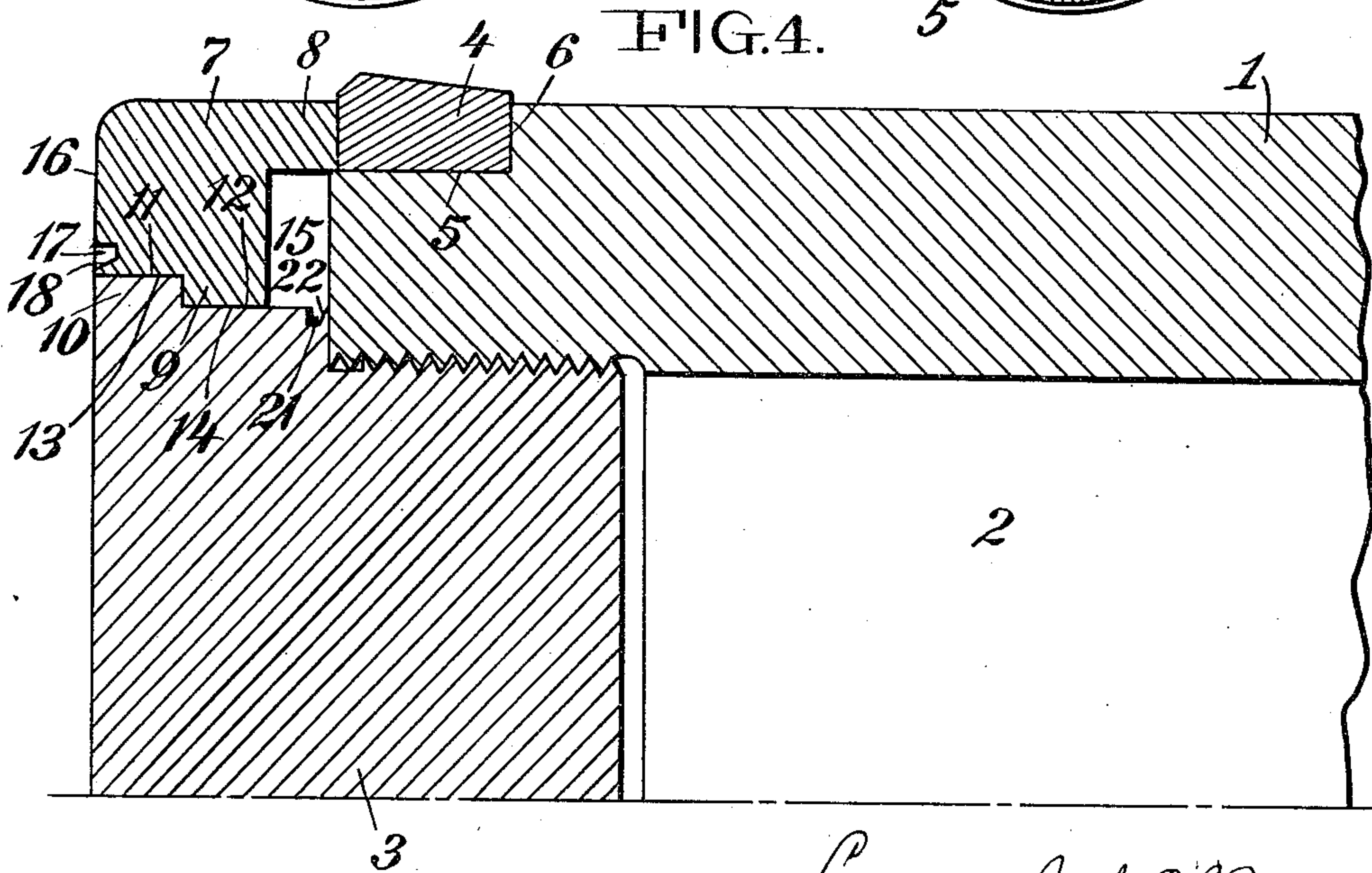
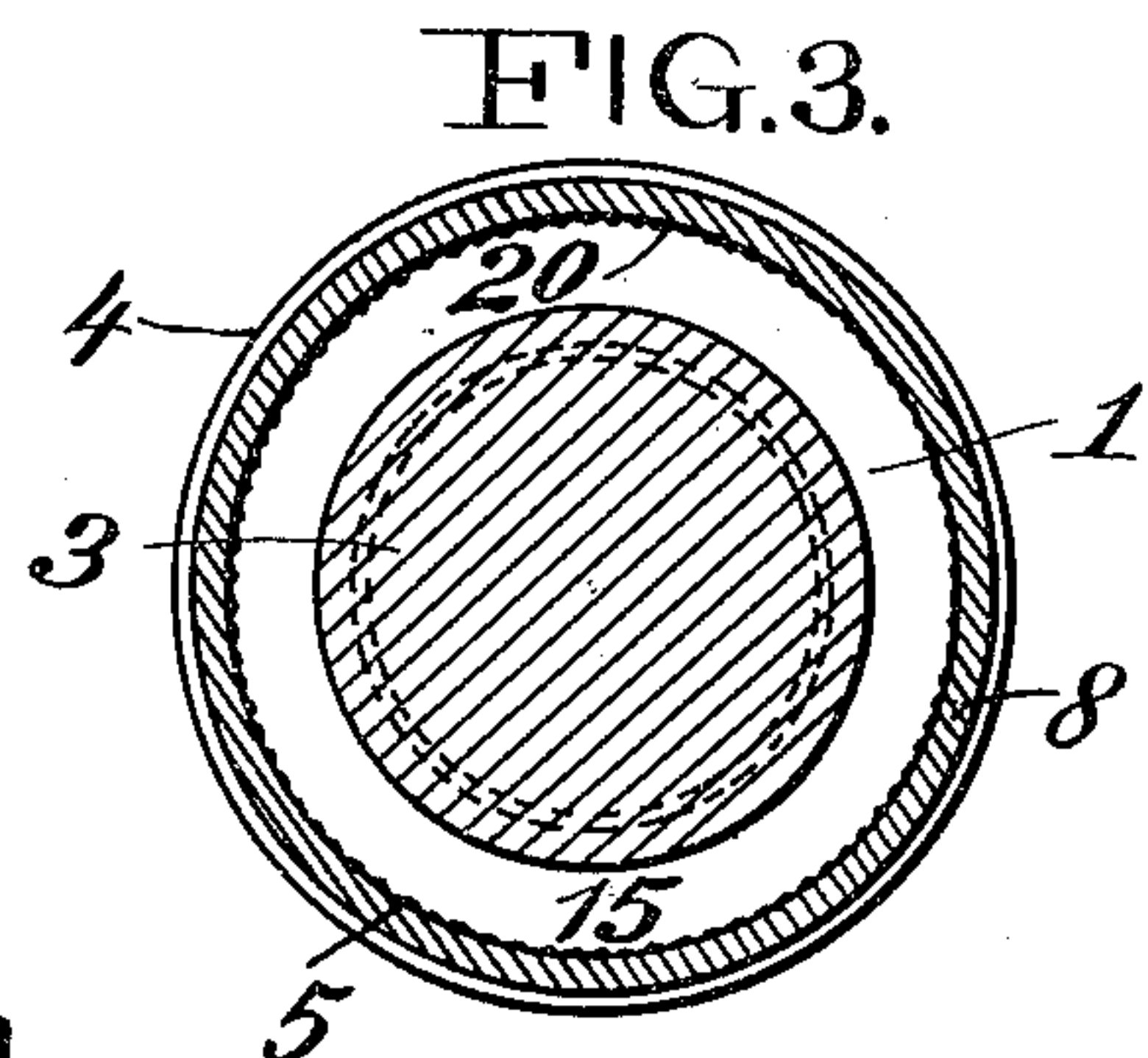
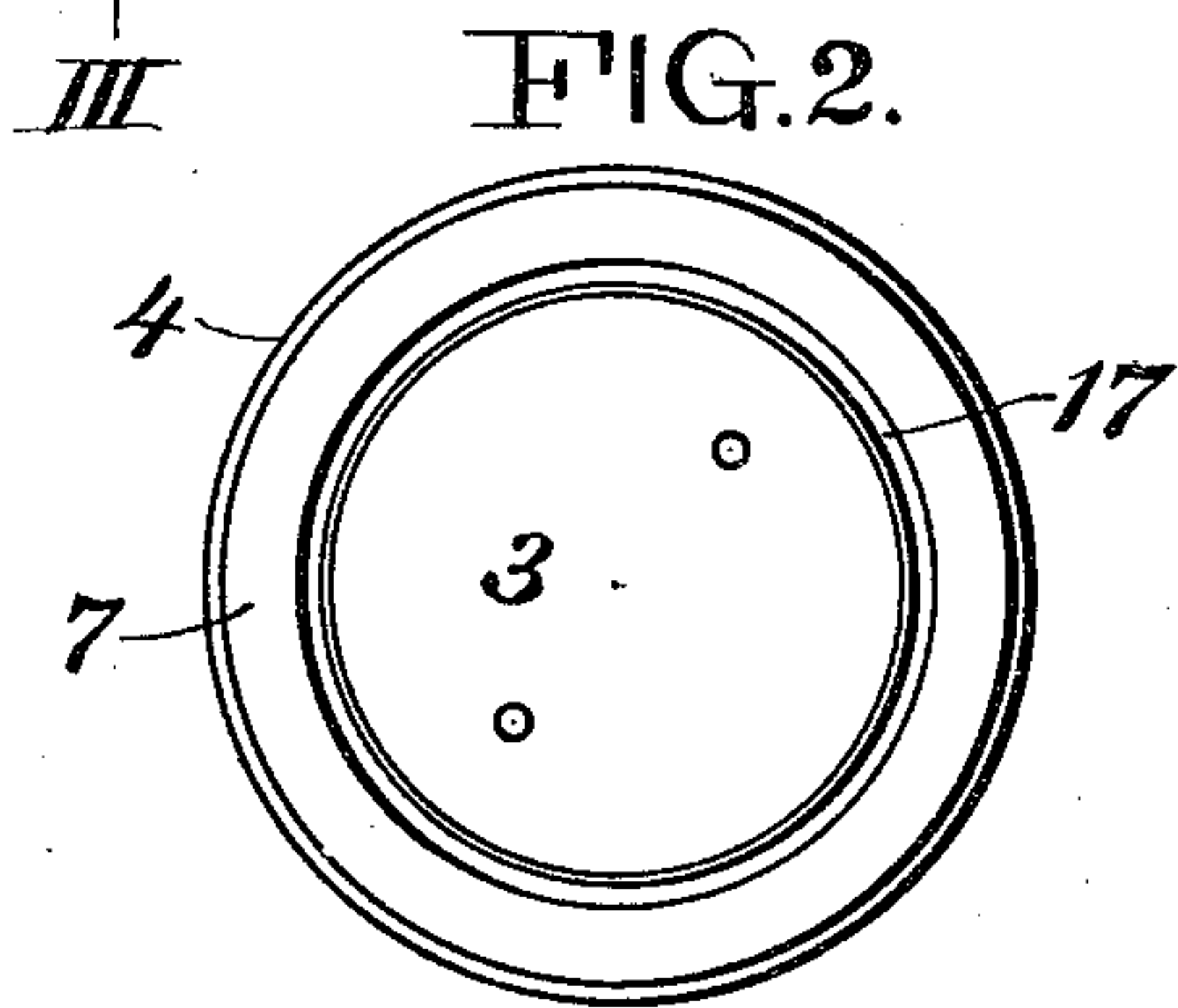
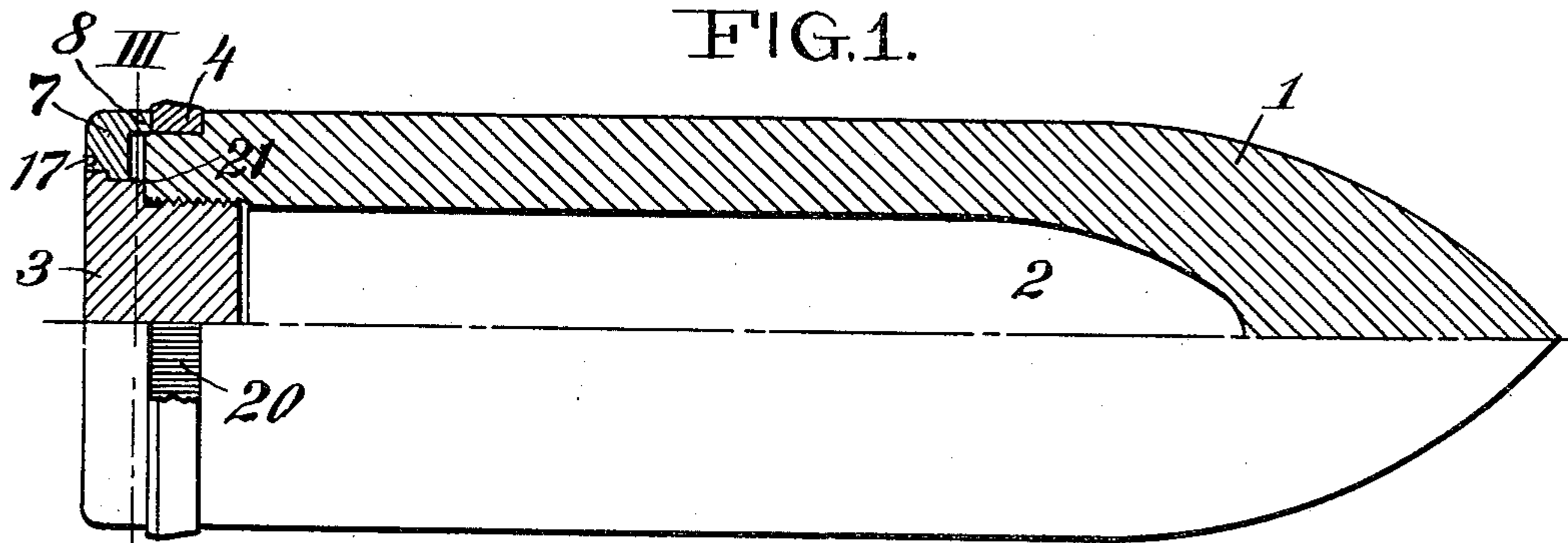


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PROJECTILE.
APPLICATION FILED JUNE 28, 1909.

998,711.

Patented July 25, 1911.



Witnesses:
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UNITED STATES PATENT OFFICE.

LESLEY J. McNAIR, OF THE UNITED STATES ARMY.

PROJECTILE.

998,711.

Specification of Letters Patent.

Patented July 25, 1911.

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To all whom it may concern:

Be it known that I, LESLEY J. McNAIR, a citizen of the United States of America, lieutenant in the United States Army, have
5 invented certain new and useful Improvements in Projectiles, of which the following is a specification.

My invention relates to projectiles and particularly to improvements in obturating
10 and rotating bands therefor of the general form shown in my companion application for patent, Serial Number 504,517 filed of even date herewith.

Among the objects of my invention are to
15 provide a structure by which a rotating band or ring of greater cross section than that generally in use may be applied to the projectile, and to provide means for readily attaching such a ring.

20 It is also an object of my invention to provide means whereby this ring may be expanded or upset, to seal the space between the projectile and the bore of the gun, thus preventing the escape of gases by the pro-
25 jectile upon the firing of the gun and the consequent erosion of the bore. The upsetting of the band will also cause it to properly grip the rifling, although the bore of the gun may be seriously worn.

30 In the accompanying drawings which form a part of this specification, I have shown a specific embodiment of my invention which I have chosen for purposes of illustration, but I do not wish to be under-
35 stood as limiting myself to the precise construction shown, as many modifications may be made therein.

In these drawings Figure 1 is a side view of a projectile embodying my invention,
40 one-half in section and one-half in elevation. Fig. 2 is a rear elevation of my projectile. Fig. 3 is a transverse section, taken on the line III—III of Fig. 1, and Fig. 4 is a longitudinal sectional view upon an en-
45 larged scale of a portion of the projectile shown in Fig. 1.

Referring to the drawings in detail, the numeral 1 designates a projectile having a cavity 2 for the reception of an exploding
50 charge. For closing this cavity a plug 3 is provided.

4 is the obturating rotating band, preferably formed of some more or less compressible material, such as copper. This
55 band is fitted to a seat 5 upon the rear of the projectile and abuts against a shoulder 6.

I preferably roughen the seat, or seat and shoulder in some suitable manner, as by knurling the same, as shown at 20 in order to insure a firm grip of the band 4 there-
60 upon. The band is thus enabled to transmit to the projectile the rotation imparted to it by the rifling of the gun. A ring 7 is provided to retain the band 4 in place and to upset the same upon the firing of the gun.
65 This ring or pressure member has a forwardly projecting flange 8 engaging with the rear face of the band 4, and has an inwardly projecting flange 9 which engages with an outwardly projecting flange 10 on
70 the plug 3. In my preferred form the ring is mounted to slide upon the rear portion of the plug, being provided with seating surfaces 11 and 12, engaging with surfaces 13 and 14 respectively on the plug. For pre-
75 venting the entrance of gases into the space 15, where they would reduce the effective pressure, acting to move the ring forward, and also tend to leak under the band 4, I cut a groove 17 near the inner edge of the rear
80 face 16 of the ring. A thin wall or fin 18 is thus left adjacent to the surface 13 on the plug, this wall being sufficiently flexible to be forced tight against the surface 13 under the action of the powder pressure.
85 The joint between the ring and plug is thus effectually sealed. An advantage of this method of sealing this joint is that the pressure of the wall upon the surface 13 is at all times proportionate to the pressure of the
90 gases which must be excluded from the joint, and thus no greater pressure is used than is absolutely necessary, and no excessive resistance to the forward movement of the ring is offered. A groove 21 may also
95 be cut in the plug leaving a thin wall 22 adjacent to a face of the projectile, to prevent leakage of gases into the charge cavity should they in any manner obtain access to the space 15.
100

To assemble the device, the band 4 is forced upon its roughened seat 5, the fit being sufficiently close to cause the roughened surface of the latter to take a firm hold of the inner surface of the band. The ring
105 7 is then slipped over the plug, the shell charged, and the plug screwed into place. The shell is now ready for loading. In the loading operation the shell is rammed firmly home in the gun, the band 4 seating against
110 the inner ends of the lands of the rifling with a considerable shock. The powder

charge is then placed in the powder chamber, the breech locked and the gun fired. The gas pressure in the powder chamber acting upon the rear face of the plug starts the projectile moving forward through the bore of the gun, but as this powder pressure also acts on the rear face of the pressure ring 7, which has less inertia to be overcome than the heavier projectile, the ring will be forced forward first and will slide relatively to the projectile, upsetting the band 4 and causing it to expand and fill the bore of the gun and the grooves of the rifling. The escape of gases past the rotating band, which is the principal source of gun erosion, is thus entirely prevented and the life of the gun prolonged. As the pressure on the rear face of the ring continues throughout the travel of the projectile in the gun, the band 4 has a constant tendency to expand and fill up any irregularities occurring in the bore and compensate for the wearing away of its own outer surface due to friction. With my construction it is also possible to obtain satisfactory results with a gun eroded to such an extent as to be practically useless with projectiles having fixed rotating bands. It is also possible as the rotating band is forced upon its seat from the rear without having to be reduced in diameter, to fit a groove cut in the outer surface of the projectile, by hammering, forcing through dies, or compressing in a multiple plunger hydraulic press, to use a ring of much heavier cross section than has been the custom. The danger of breakage of the ring from centrifugal force as it leaves the gun is thus obviated.

Having thus described my invention, I claim.

1. In combination with a projectile having a seat thereon and a cavity for the reception of a charge, a rotating ring mounted upon said seat, a pressure member engaging said rotating ring, a plug closing the cavity therein, said pressure ring being slidably mounted upon said plug, said plug being provided with means for limiting rearward movement of said pressure ring.

2. In combination with a projectile having a charge cavity therein, said cavity being open at the rear, a plug for closing said

cavity projecting beyond the rear end of said projectile, said projecting portion of the plug being provided with a cylindrical seating surface and an outwardly extending flange, a rotating band, and a pressure ring engaging the said band, said pressure ring being slidably mounted upon said cylindrical surface of the plug, and having an inwardly projecting flange engaging with the outwardly projecting flange on the plug and limiting the rearward movement of said pressure ring.

3. In combination with a projectile, an obturating rotating band mounted thereon, a pressure ring engaging the rear face of said band, a member secured to said projectile and projecting rearwardly therefrom, said member having a cylindrical seating surface upon which said pressure ring is slidably mounted, and an annular fin formed on said pressure ring, the inner surface of which engages the seating surface on the rearwardly projecting member.

4. In combination with a projectile having a seating surface for an obturating rotating band and a charge receiving cavity open at the rear, a plug for closing said cavity, a portion of which projects rearwardly from said projectile, a cylindrical seating surface on said rearwardly projecting portion, a pressure ring mounted upon said seating surface and engaging the rear face of said obturating rotating band, said ring and said plug having interengaging means for limiting the rearward movement of the ring, and an annular groove cut in the rear face of the ring adjacent to the joint between said ring and said plug.

5. In combination with a projectile having a seat thereon and a cavity for the reception of a charge, a ring mounted upon said seat, a pressure member engaging said ring, a plug closing the cavity in the projectile, said pressure member being slidably mounted upon the said plug, said plug being provided with means for limiting rearward movement of said pressure member.

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Witnesses:

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