

No. 627,929.

H. & T. ANDREWS.  
PROJECTILE.

Patented June 27, 1899.

(Application filed Dec. 13, 1897.)

(No Model.)

FIG. 1

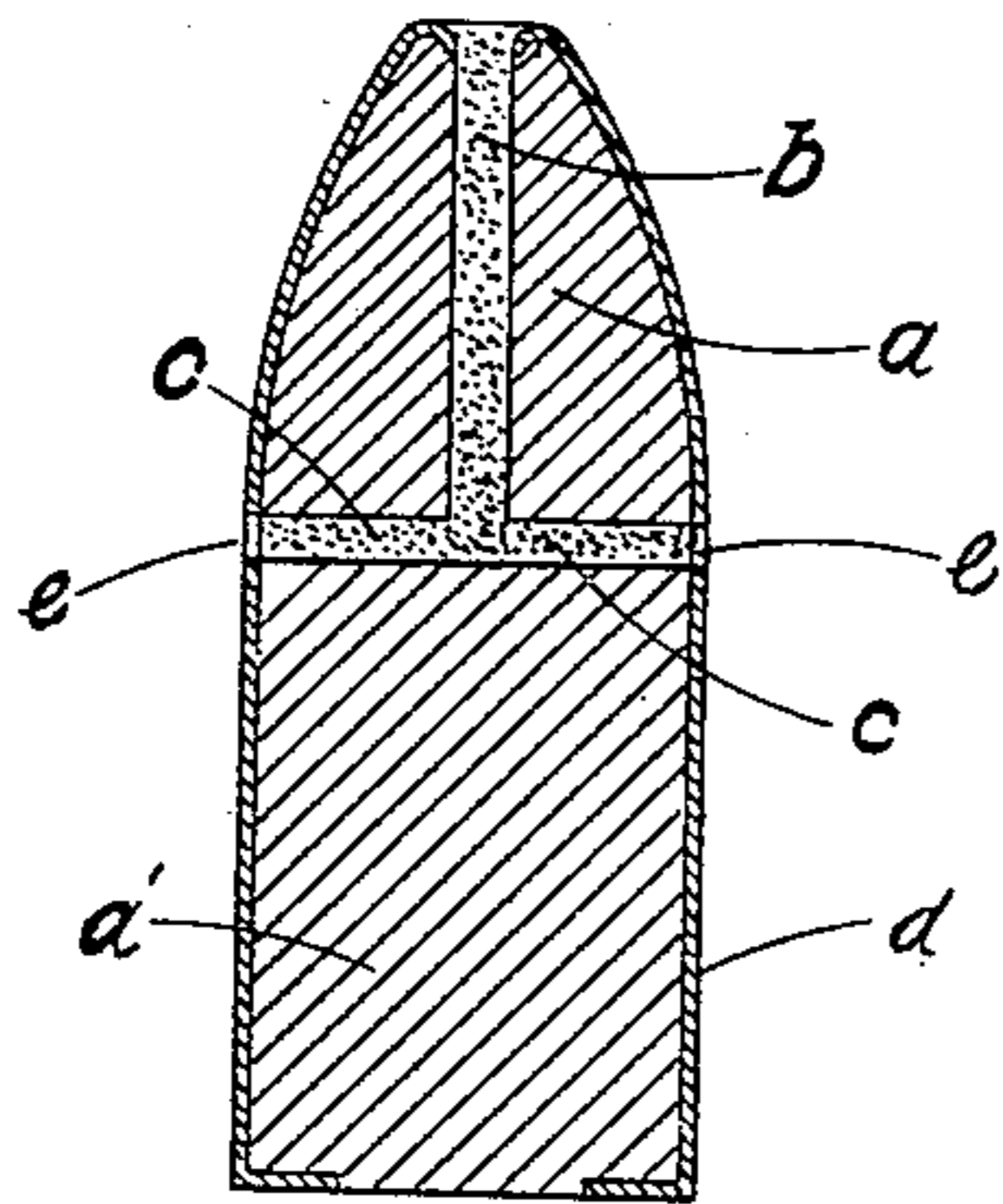


FIG. 2

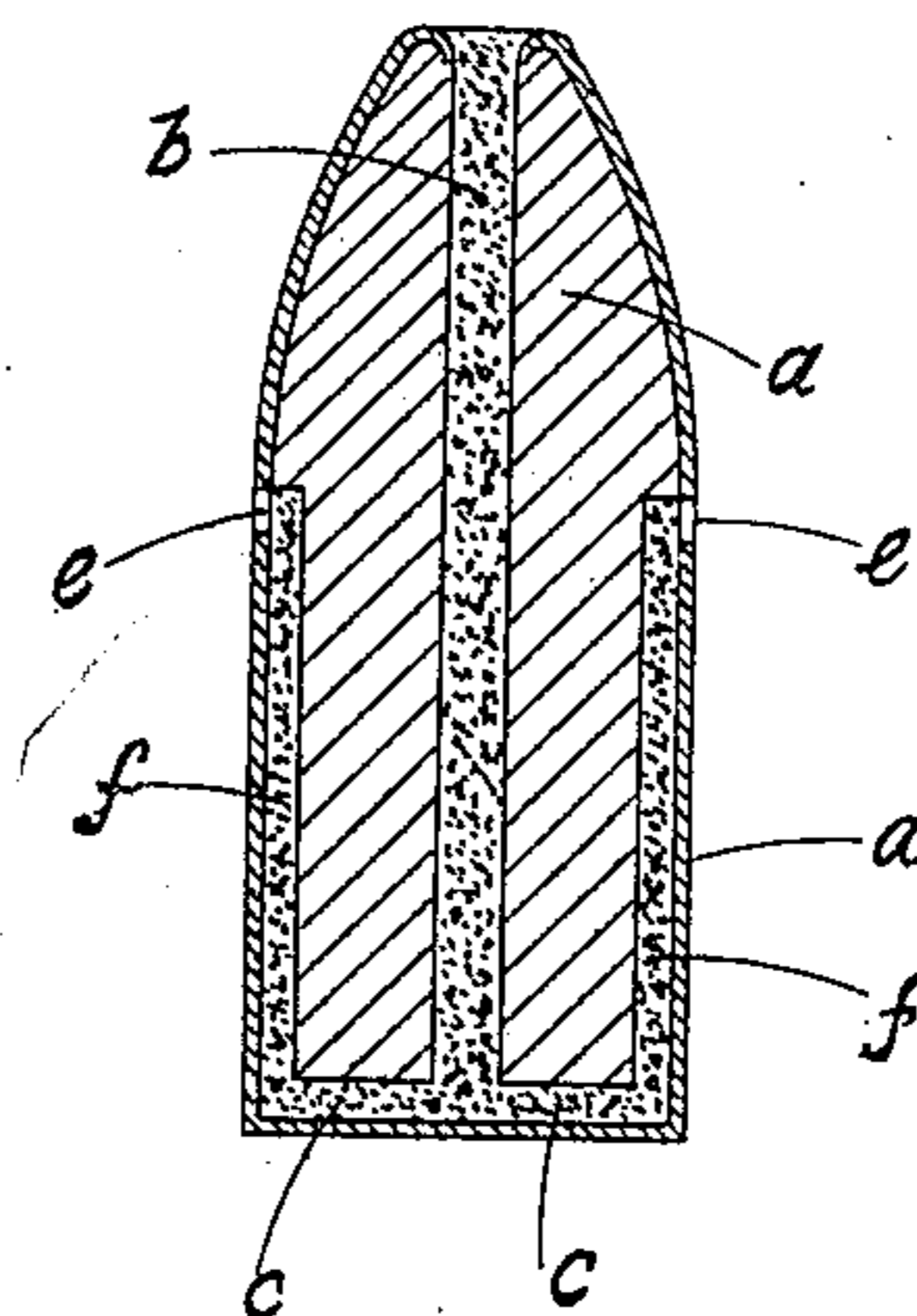


FIG. 3

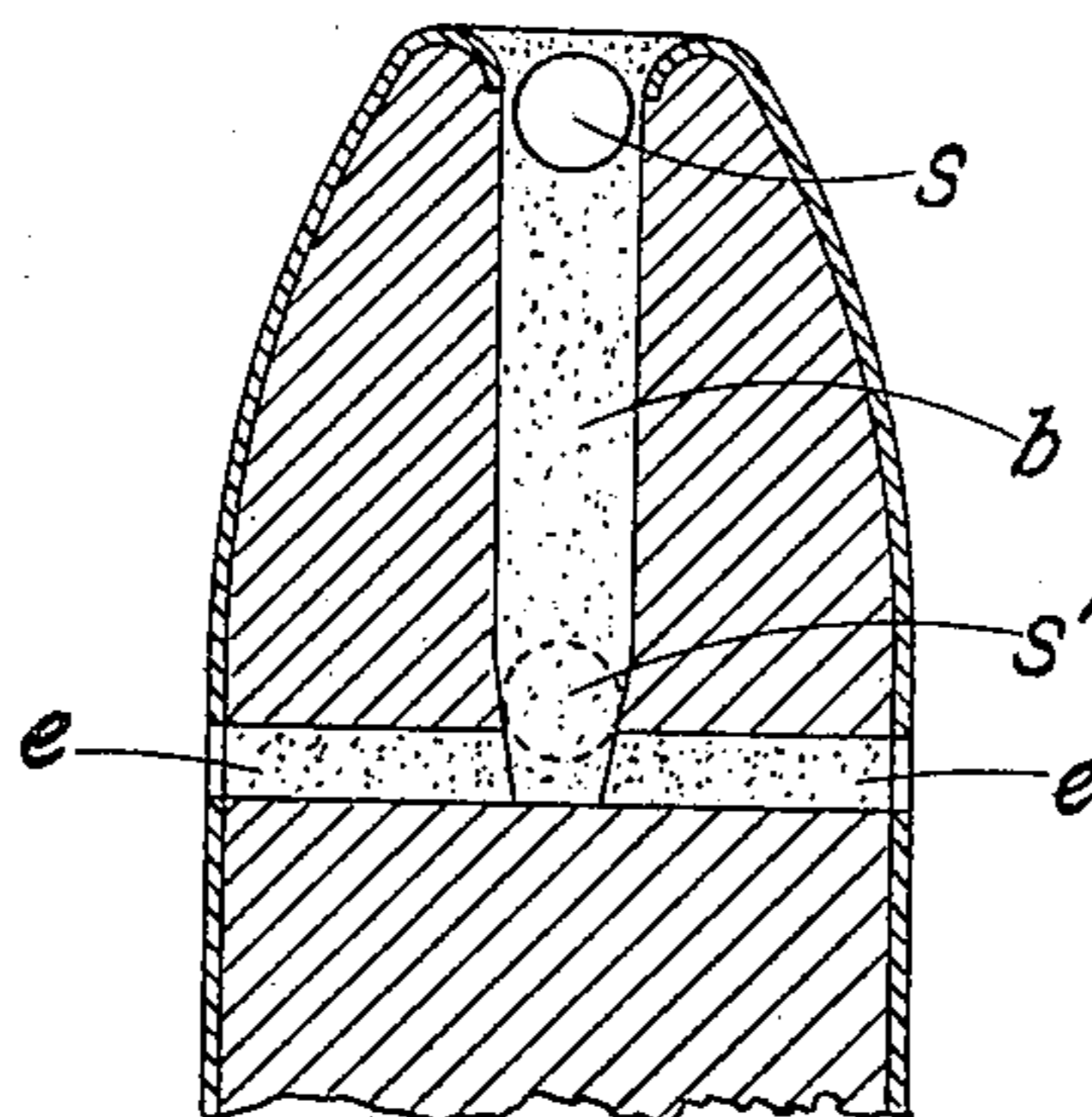


FIG. 4

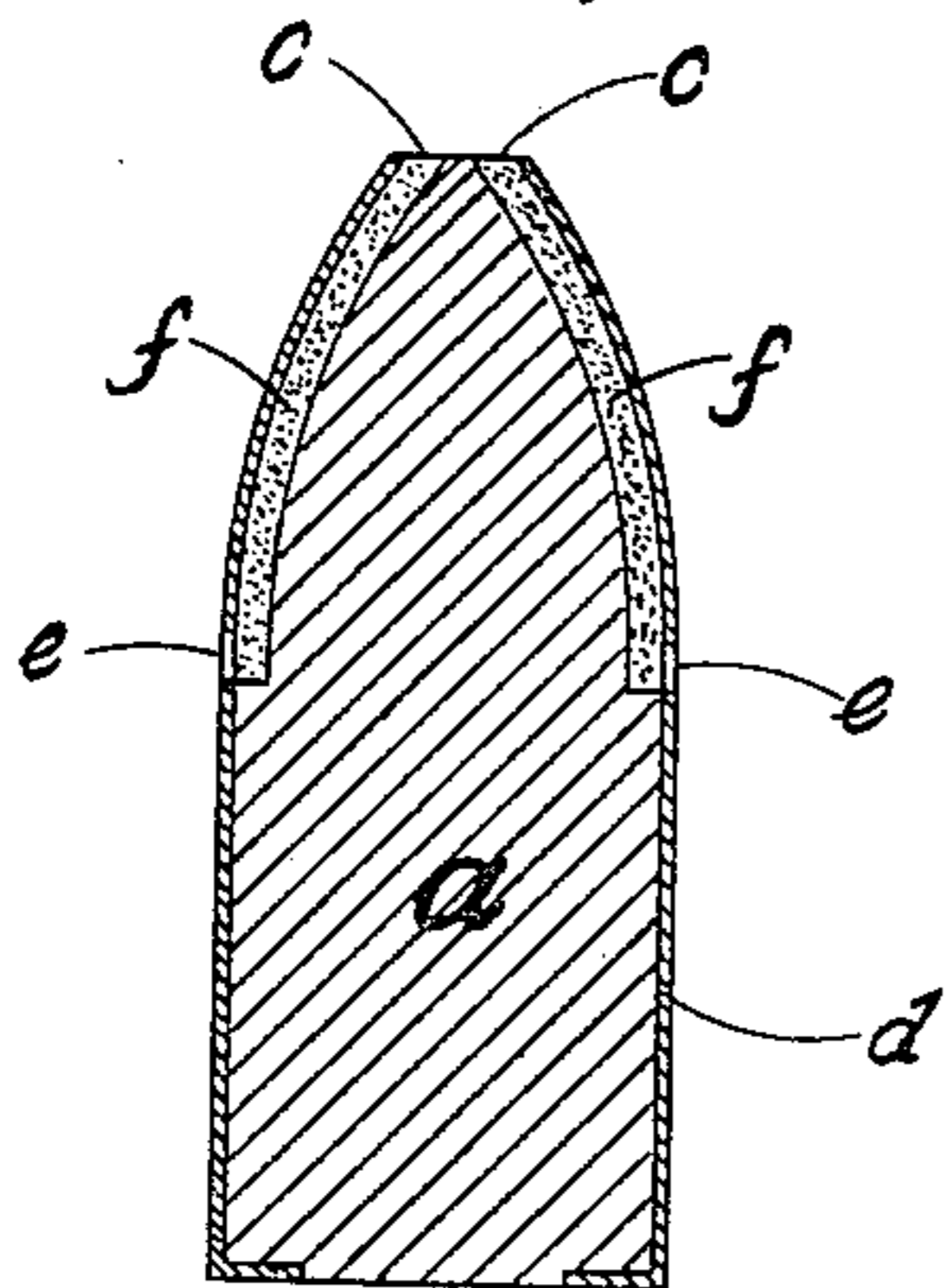
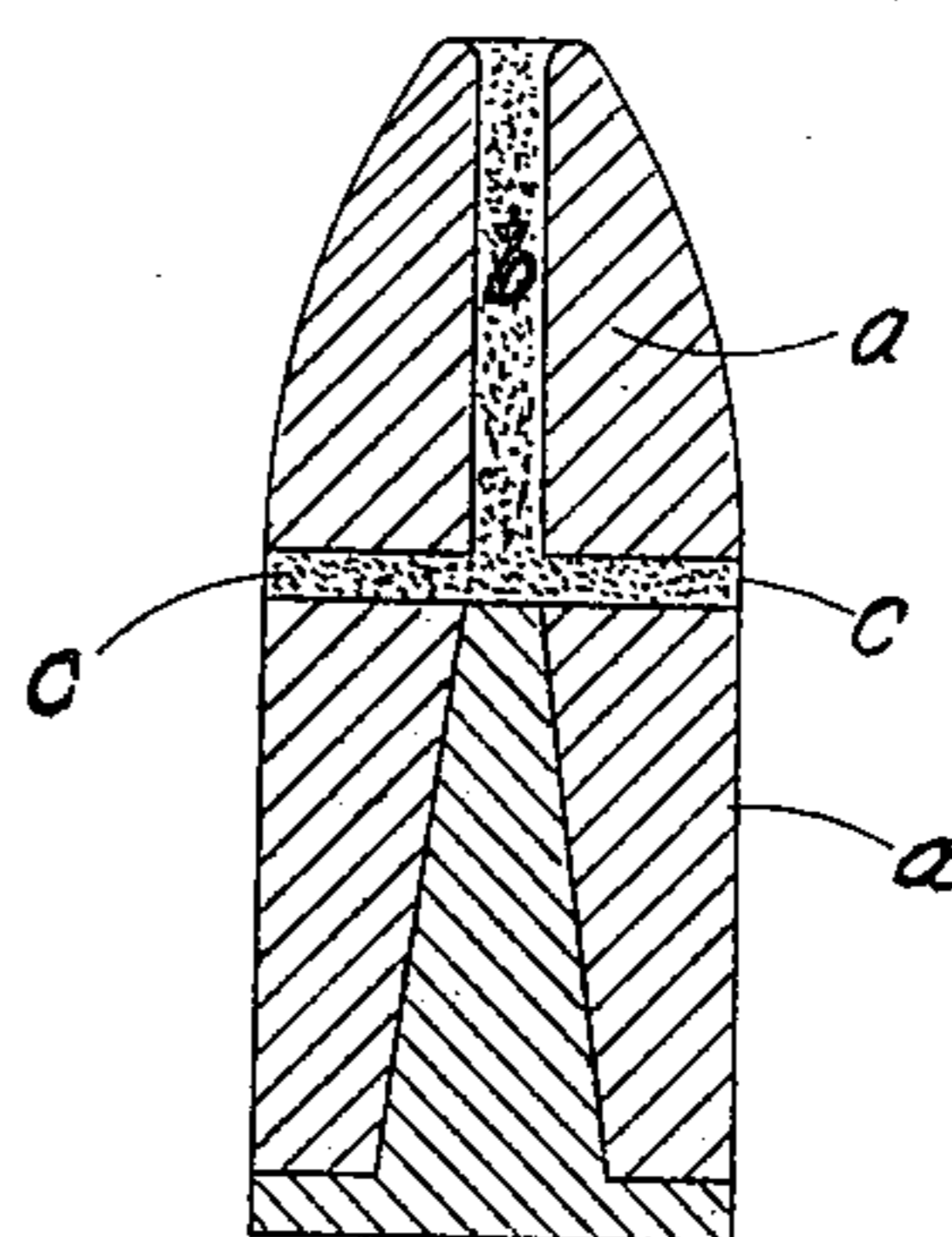


FIG. 5



Witnesses  
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Inventors  
Harry Andrews  
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# UNITED STATES PATENT OFFICE.

HARRY ANDREWS AND THOMAS ANDREWS, OF LONDON, ENGLAND.

## PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 627,929, dated June 27, 1899.

Application filed December 13, 1897. Serial No. 661,744. (No model.)

*To all whom it may concern:*

Be it known that we, HARRY ANDREWS and THOMAS ANDREWS, gun-makers, subjects of the Queen of Great Britain, and residents of 31 New road, Woolwich, London, county of Kent, England, have invented certain new and useful Improvements in and Relating to Projectiles for Small-Arms and for Machine and other Guns, (for part of which invention Harry Andrews has obtained in Great Britain a patent, No. 16,836, dated September 9, 1895; in Belgium, No. 122,419, dated July 9, 1896; in France, No. 257,966, dated July 10, 1896; in Spain, No. 19,340, dated July 14, 1896; in Italy, No. 42,331, dated August 17, 1896; in Austria, No. 3,397, dated September 4, 1896, and in Germany, No. 91,593, dated July 4, 1896,) of which the following is a specification.

Our invention relates to projectiles for firearms, and has for its main object the production of a self-lubricating projectile—that is to say, a projectile containing a suitable quantity of lubricating material and so formed that as it is propelled along the barrel of the firearm the lubricating material will be pressed or forced outward onto or against the interior surface of the barrel, which will thus be efficiently lubricated, so as to diminish the friction between it and the projectile.

The accompanying drawings show several longitudinal central sections of our projectiles and which are more particularly herein-after individually referred to.

In our improved projectile we utilize the inertia of the atmospheric air and of the lubricating material for pressing or forcing out the latter when the projectile is driven forward by the explosion of the charge in the gun. For this purpose we make our improved projectile with one or more longitudinal passages extending from the forward end or point of the projectile and terminating in a series or group of passages which extend radially to and through the exterior surface of the projectile either at a right angle or at any other suitable angle to the longitudinal passage or passages, or the radial passages may be curved.

We fill the said passages with a suitable lubricating material, so that when the projectile is moved forward by the explosion of the powder charge the said lubricating material will be forcibly expelled or squeezed out of

the said radial passages onto the bore of the gun or into the grooves of the rifling.

We sometimes find it expedient to employ an air-check situated within the longitudinal passage. This air-check preferably consists of a spherical ball of lead or alloy or a metallic cup-shaped piece adapted to be inserted in the longitudinal passage, preferably after the lubricating material is let in, and is designed to move freely with the lubricating material as the latter is being expelled. When the air-check reaches its seating at or toward the bottom of the longitudinal passage after the expulsion of the lubricant, it closes the said passage and prevents the air passing through the passages during the flight of the projectile.

A rifle-bullet can be conveniently manufactured in accordance with our said invention as follows, viz: We make the core in two parts, the forward part having a longitudinal passage extending completely through it, and the rear end of the forward part or the forward end of the rear part being so formed that there will be between the two parts when placed together an annular or circumferential groove, channel, or recess, and radial channels connecting the same with the said longitudinal passage, or we make the core in a single piece with a longitudinal passage extending completely through it and with radial grooves or channels at its rear end connecting the said passage with a circumferential recess or channel at the base of the core. In both of these forms of construction the outer covering or hard sheath of the bullet is made with a circumferential group or groups of small holes, which when the core is inserted coincide in position with the said circumferential channel or recess.

In applying our invention to tubular bullets or projectiles having a removable or detachable base we provide the same with radial holes or passages extending from the interior to the exterior of the tube and we fill the interior of the tube either wholly or partially with the lubricating material. It may be advantageous in either case to form a circumferential depression or channel in that part of the exterior surface of the projectile where the orifices of the radial passages are situated.

Our invention is applicable to small-arm projectiles formed in one solid piece and also to cast or forged projectiles of larger size—such, for instance, as those used in machine and quick-firing guns or ordnance. The channel or channels or passages for the lubricating material may be formed by drilling or in the process of forging or casting the projectile.

The accompanying drawings show in longitudinal central section various forms of our improved projectile, which we will now more particularly describe. The passages and channels referred to in the drawings are shown with the lubricant therein.

The projectile shown in Figure 1 is made with a core formed in two parts or pieces  $a$   $a'$ , the forward part  $a$  having a passage  $b$  extending longitudinally through it and having in its rear end radial or tangential grooves or channels  $c$ , extending from the said passage  $b$  to the periphery of the part  $a$ . The rear part  $a'$  is made of cylindrical form and bears against the rear end of the forward part  $a$ , the two parts being inclosed in the metal sheath or casing  $d$ , in which are formed holes  $e$  for the discharge of the lubricating material, or, if desired, the core shown in Fig. 1 can be made in a single piece, the longitudinal passage  $b$  and the radial channels  $c$  being formed by punching and drilling or in any other convenient manner. The core, when made in two parts or pieces, may, if desired, be fitted together or joined longitudinally instead of transversely.

In Fig. 2 we have shown a projectile in which the core is made in a single piece  $a$ , having the passage  $b$  extending longitudinally through it and having the radial grooves or channels  $c$  formed in its base. The said radial channels in this case communicate with the group of holes  $e$  and  $e'$  in the sheath or casing  $d$  through longitudinal grooves or channels  $f$ , formed in the exterior surface of the said core.

In Fig. 3 we have shown one form of our projectile provided with a sliding spherical air-check  $s$ . The position of the air-check after the expulsion of the lubricant is shown at  $s'$ .

The core of the projectile shown in Fig. 4 is made in a single piece  $a$ , having in its forward end or point radial grooves or channels

$c$ , which communicate with the holes  $e$  in the sheath or casing  $d$  through longitudinal grooves or channels  $f$ , formed in the periphery of the said core.

In Fig. 5 we have shown a tubular projectile  $a$  having a detachable base  $g$  and having radial channels  $c$  extending from its longitudinal passage  $b$  to its periphery, about midway between its ends.

When the projectile is discharged from a firearm, the lubricating material will during the movement of the projectile along the barrel be forced out of the channels  $c$  by the resistance of the air in the barrel and by the inertia of the lubricating material itself onto the interior surface or bore of the barrel or into the rifle-grooves thereof, and will thus efficiently lubricate the same and the projectile. When desired, an air-check is put into the longitudinal passage  $b$  with the lubricant to close the same to air-currents after the lubricant has been expelled.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A projectile having a series of perforations in its body which alike meet a concentric passage formed from its head to a limited distance toward its base, the said perforations and passage being filled with lubricating material substantially as and for the purpose set forth.

2. A projectile having a series of perforations in its body which alike meet a concentric passage formed from its head to a limited distance toward its base, the said perforations and passage being filled with lubricating material and the concentric passage being provided with a movable air-check to prevent the air passing through the said passage during the flight of the projectile after the lubricant has been pressed out, substantially as set forth.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of the subscribing witnesses, this 4th day of December, 1897.

HARRY ANDREWS.  
THOMAS ANDREWS.

Witnesses:

F. ANDREWS,  
E. ANDREWS.