

J. W. COCHRAN  
PROJECTILE.

No. 30,123.

Patented Sept. 25, 1860.

Fig. 1.

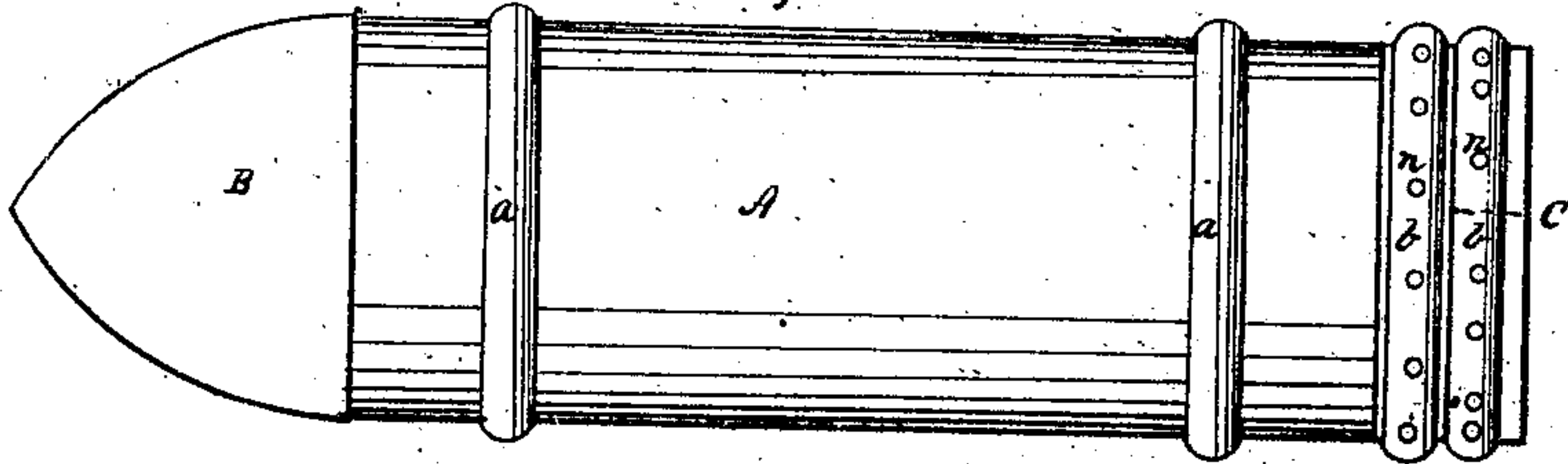


Fig. 2.

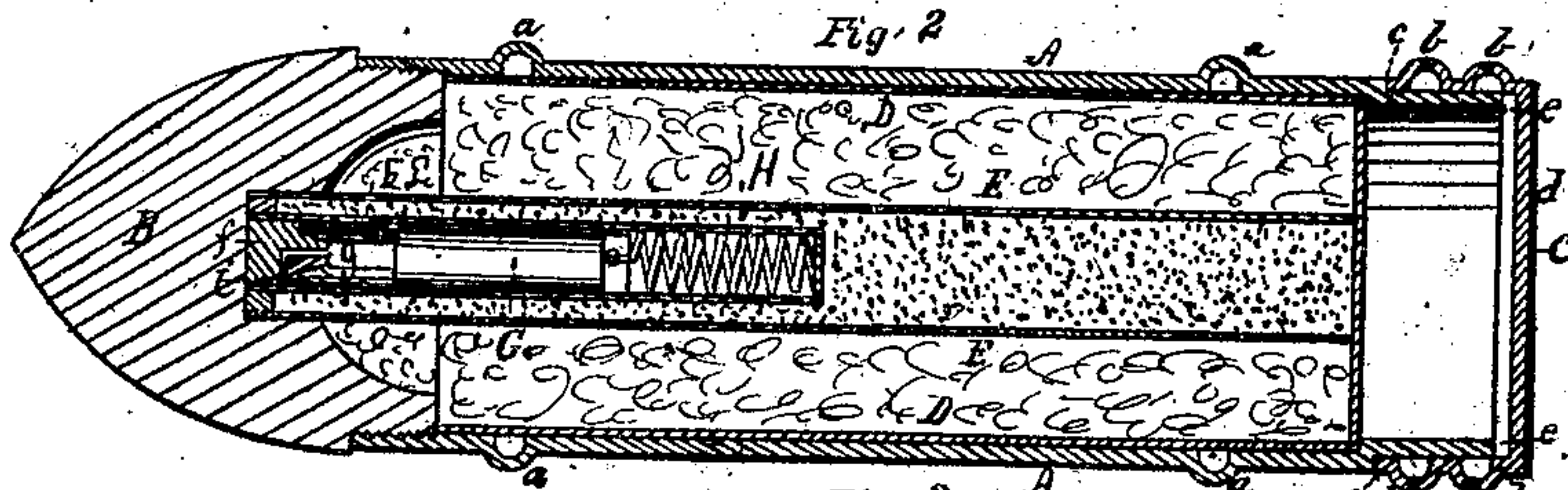


Fig. 3.

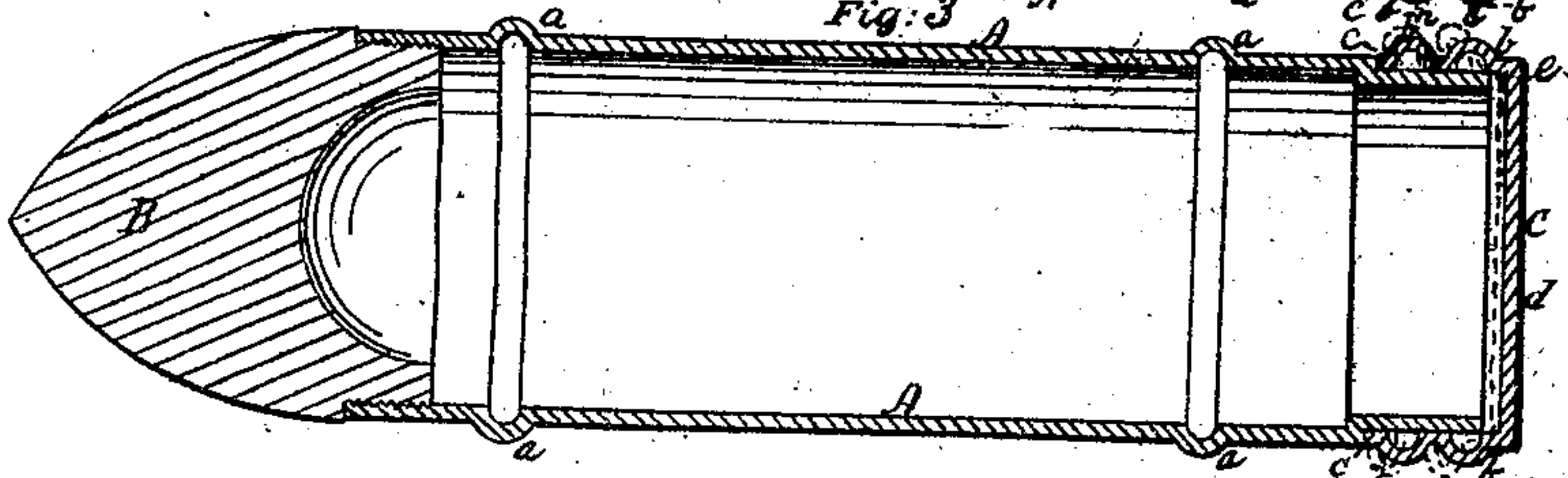


Fig. 4.

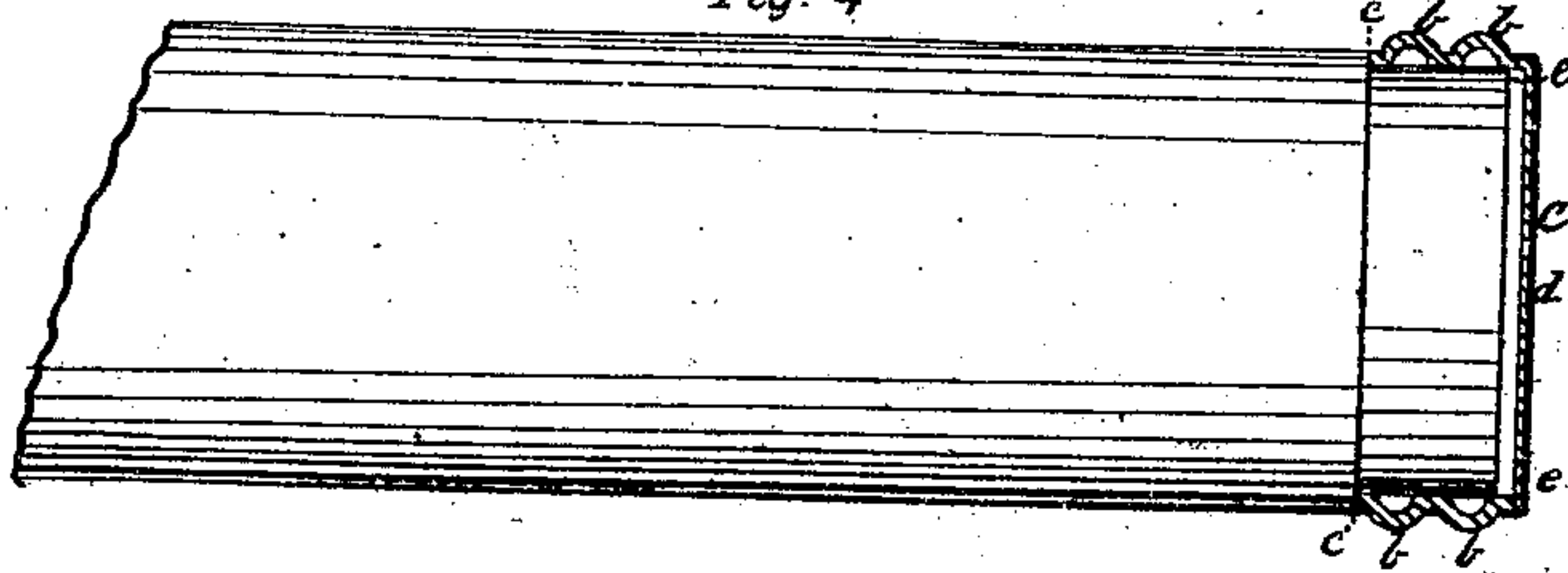


Fig. 5.

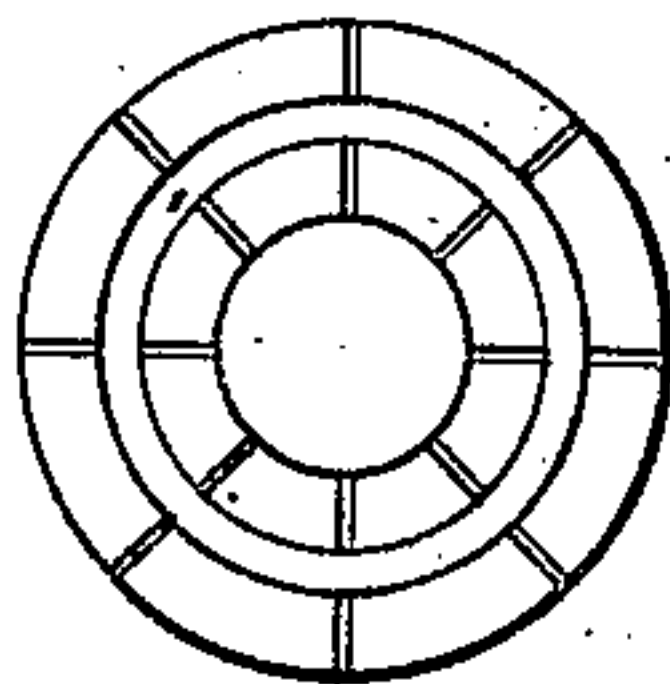


Fig. 6.



Witnesses.

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## IMPROVEMENT IN PROJECTILES.

Specification forming part of Letters Patent No. 30,123, dated September 25, 1860.

*To all whom it may concern:*

Be it known that I, JOHN W. COCHRAN, of the city, county, and State of New York, have invented certain new and useful Improvements in Projectiles for Ordnance and Fire-Arms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal outside view of a shell or hollow shot with my improvement. Fig. 2 is a central longitudinal section of the same complete. Fig. 3 is a central longitudinal section of the same without its charge. Fig. 4 exhibits the application part of my invention to a solid shot. Fig. 5 is a plan of a notched ring to be used as a missile in the hollow projectile. Fig. 6 is a side view of the same.

Similar letters of reference indicate corresponding parts in the several figures.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The body of the projectile represented in Figs. 1, 2, and 3 is constructed of three pieces—viz., a hollow cylinder, A, composed of wrought-iron tubing, such as is used for boiler-flues and gas-pipe, a cast or wrought iron head, B, constituting the front end, and a wrought-iron cup, C, constituting the base or butt. The rear end of the cylinder A is swaged down or otherwise reduced in size externally to receive the cup C, the exterior of which is of no larger diameter than that of the cylinder A. The cup C is fitted neatly onto the cylinder. The head B is represented as being screwed into the cylinder; but the latter may be shrunk upon the head by being placed on hot and allowed to cool. The cup, when put on, fits up to a shoulder, *c*, on the cylinder, but its length or depth must be such as to leave a considerable space between its bottom *d* and the rear end of the cylinder A, as shown at *e e* in Fig. 1.

*a a*, Figs. 1, 2, 3, are two hollow beads or fillets, formed to project from and all around the exterior of cylinder A, by swaging or other mechanical manipulation—one near the front end and the other near the rear of the cylinder—and *b b* are two similar beads or fillets formed upon the cup C.

Projectiles for muzzle-loading ordnance or fire-arms may be made of such size that the projecting beads or fillets *a a b b* will fit easily to the lands of the bore of the gun, and those for breech-loading pieces may be made of similar size, in which case the chamber will not require to be tapered or enlarged; but those for breech-loading pieces with tapered or enlarged chambers might be made somewhat larger, if it should be found of any advantage. The operation of these beads *a a b b* is as follows: When the gun is fired, the force of the explosion of the charge of powder acts principally against the base or bottom *d* of the cup C, but to some extent upon the rear sides of the beads or fillets *a a* and *b b*, more especially of the rearmost one, and before the inertia of the projectile can be overcome the hollow beads or fillets *a a* and *b b* yield to this force, and, as it were, close up or are “upset” in the direction of the length of the projectile, and are consequently expanded in a lateral direction toward the bore and rifle-grooves, and thereby made to fit tightly into the bore and forced into the grooves in such a manner as to fill them, or, at least, to such a depth as to insure the rotary motion of the projectile being produced by its being driven forward through the gun.

The above action of the beads or fillets is illustrated in Fig. 3, where the cup is represented, in red color, as having its bottom or base driven forward and its hollow beads or fillets *a a* upset lengthwise of the projectile and expanded laterally. In this action of the hollow beads or fillets, it is obvious, the projectile is shortened.

I do not propose, generally, to use the cup C when the cylindrical portion A of the hollow projectile has the hollow beads or fillets *a a* formed in or upon both its front and rear, but propose, generally, in such case to make the rear end or butt of the shell of a solid piece of cast-iron. The cup C, with its hollow beads or fillets, is more especially designed for solid shot, on which it is to be fitted up to a shoulder, *c*, as shown in Fig. 4, where part of the shot is shown, in blue color, in substantially the same manner as to the cylinder A, as hereinabove described. The portion A of the shot or the cup C, instead of having only a small number of beads, *a a b b*, may be corrugated their whole length. A cup constructed simi-



lar to C, with the hollow beads or fillets *a a*, may, if made of copper or sufficiently-ductile metal, be applied in combination with bullets for small-arms. The cup C, though fitted easily into the projectile in the first place, is caused by the upsetting action to clamp the projectile so tightly that when used alone it will cause the shot to rotate with it. It may, however, be screwed onto a short screw-thread formed close to the shoulder *c*. The rear end of the shot or projectile may be made solid, and in that case the bottom of the cup may be omitted, so that it will have the form of a corrugated ring, being screwed upon the shoulder as just mentioned. The hollow beads or fillets in the cup may be perforated, as shown in Figs. 1 and 2, and their inner cavities be filled with grease, which, by the upsetting, will be forced out through the perforations to lubricate the gun.

D, Fig. 2, is a cylinder, made of tin-plate or other light metal, fitted loosely into the cylinder A of the hollow projectile, for the purpose of containing the missiles or substance to be scattered by the explosion of the projectile. This cylinder is open in front for filling, but has its rear closed.

E is a smaller cylinder of similar material, arranged centrally within and attached permanently to the bottom of the cylinder D, for the purpose of containing the charge of powder by whose explosion the projectile is to be burst. This cylinder E projects some distance beyond the end of D into the head B of the projectile. The missiles or substance to be scattered fills the space between the cylinders D and E, and the said cylinders, being concentric with the axis of the shell, keep the weight of the charge evenly distributed all round the said axis. The drawing represents the space between the cylinders D and E filled with sand; but it may be filled with pieces of iron, so constructed in the form of rings, as shown in Figs. 5 and 6, or portions of rings, or portions of a hollow cylinder, as to fill up the said space, in which case the powder-tube E need not be attached to the outer tube, D, but may be simply inserted within the pieces of iron, which will keep it in place concentric with D. The cylinder D facilitates the insertion within the projectile of the missiles or substance to be scattered by the explosion, the said cylinder being filled before its introduction into the projectile. The use of the cylinder E allows the powder to be transported separate from the projectiles in a magazine, but keeps it in a condition of readiness in proper quantities for charging the projectiles.

F is a smaller cylinder or tube, arranged concentrically within the front portion of the powder-tube E, to whose front end it is secured. This tube is closed at its rear end to exclude the powder, and is closed at its front

end by a plug, *f*, on the inside of which is a nipple, *g*, to receive a percussion-cap, and through which there is a vent, *i*, leading from the nipple to the interior of the powder-cylinder E. The said tube F has fitted loosely within it a plunger, G, at the back of which is connected a spiral spring, H, which is also arranged within the tube and connected with the rear of the tube, said spring being of sufficient strength to hold the plunger back from the nipple and prevent it striking the nipple and producing a premature explosion by any such movements or concussions as are incident to the handling of the projectile. In the flight of the projectile the plunger falls back in the tube; but when the projectile strikes and is arrested or retarded the momentum of the plunger makes it continue its forward movement, and so makes it strike the cap on the nipple with force enough to explode it and fire the charge of powder in the tube E, by whose explosion the bursting of the projectile is produced. By thus applying a spring in combination with a plunger a great advantage is obtained over the modes heretofore invented of applying the plunger in percussion-projectiles without a spring, as premature explosion is most effectually guarded against.

I do not claim, broadly, the insertion of a grease-groove, as shown in G. P. Foster's patent cartridge, 1860; nor do I claim, broadly, the radial packing of the missiles within the interior of the shell, as shown in Holland's English patent, 1854.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The construction of projectiles with corrugations or hollow beads *a a b b*, made and applied, substantially as herein set forth and described, so that the force of the explosion of the charge will cause said corrugations to be expanded laterally, as and for the purposes herein set forth and described.
2. The mode of providing for the lubrication of the gun by the perforations *n n* in the beads, fillets, or corrugations of the cap or other portion of the projectile.
3. Placing the missiles or substance to be scattered by the explosion of a hollow projectile within a cylindrical casing, D, fitted to the interior of the projectile, substantially as and for the purpose herein described.
4. The employment of the cup C or its equivalent with the cylinder A, as and for the purposes herein set forth and described.
5. The arrangement of the tube F, nipple *g*, plunger G, and spring H, in combination with the powder-cylinder E, substantially as herein described.

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Witnesses:

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