

N. WIARD.
Sub-Caliber Projectiles.

No. 157,049.

Patented Nov. 17, 1874.

fig. 1.

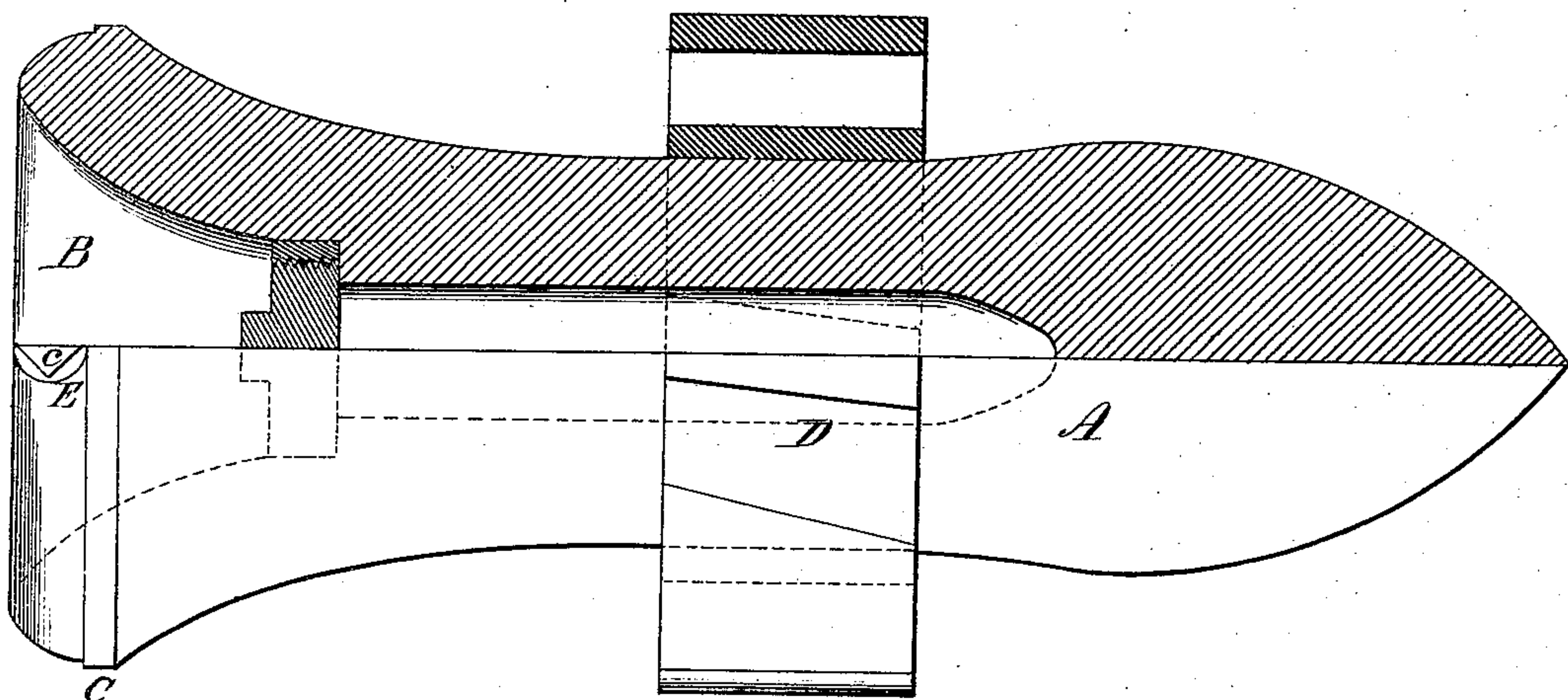
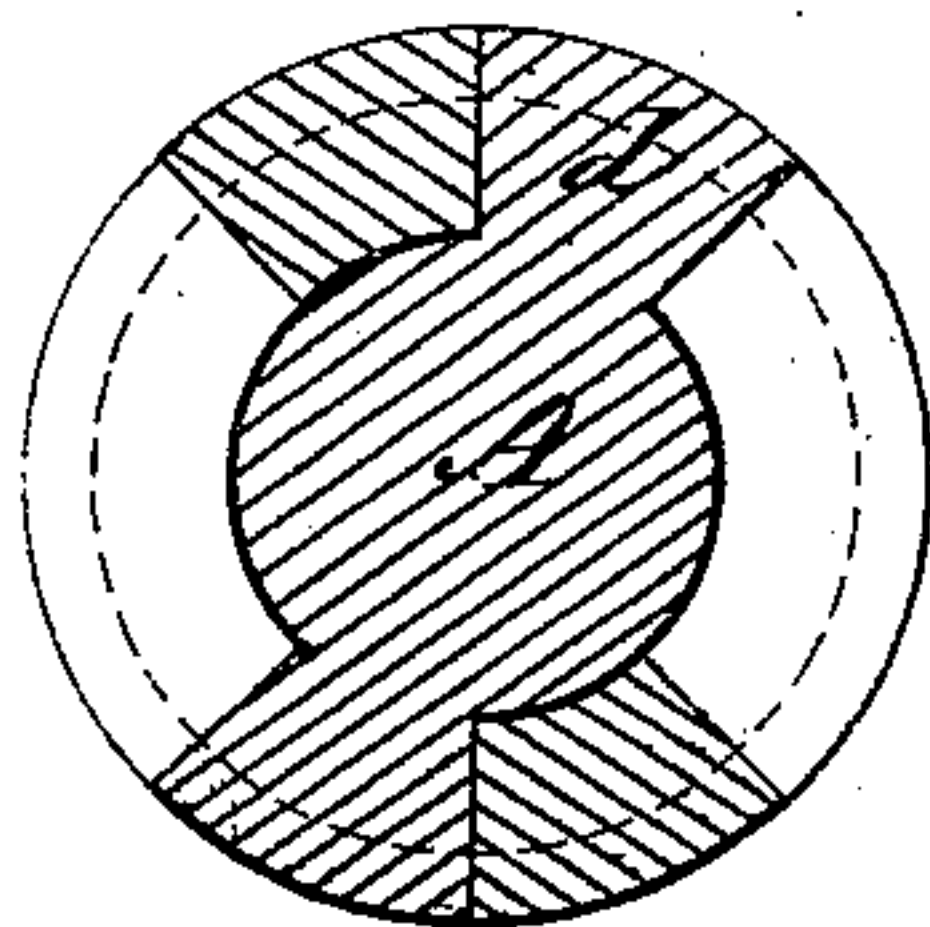
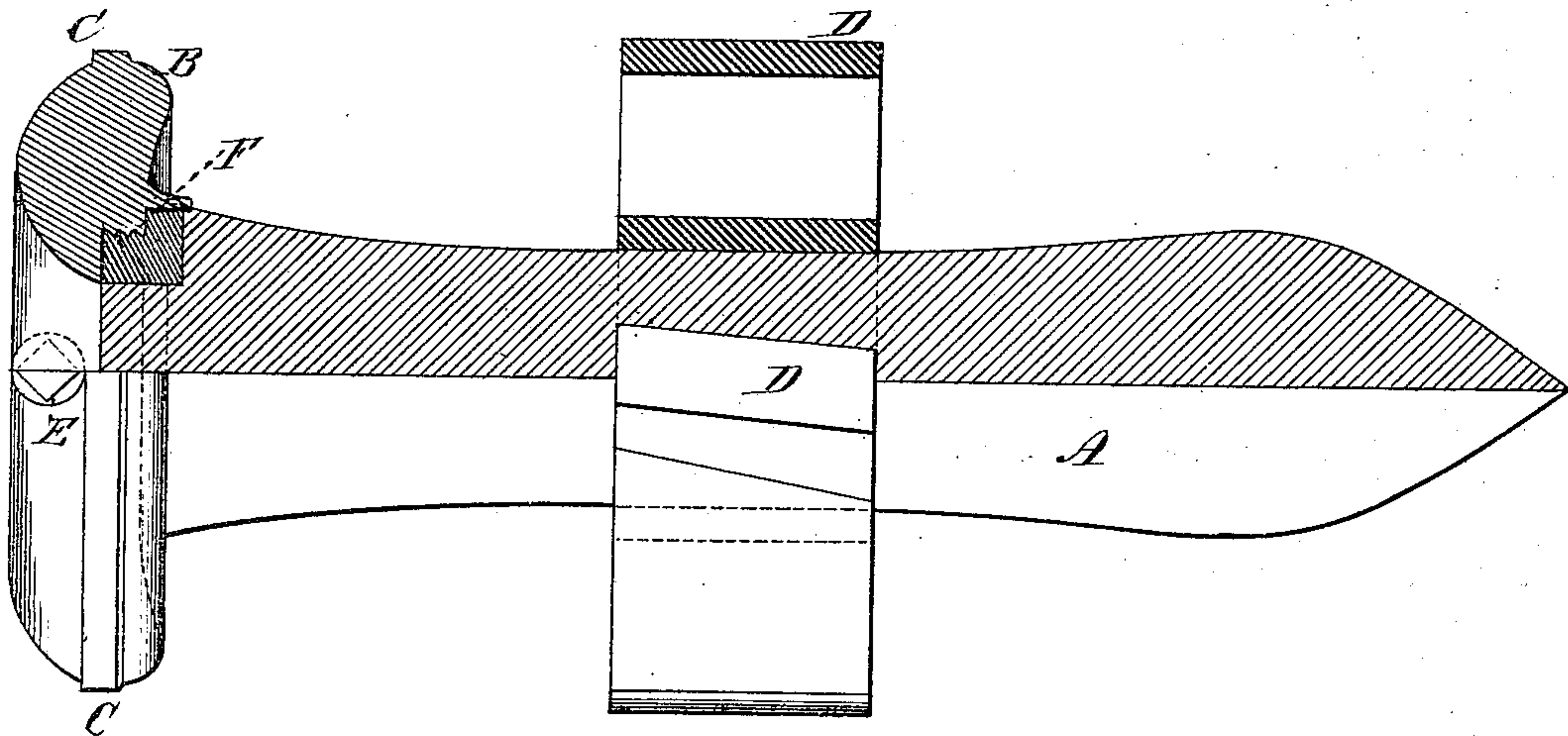


fig. 2.



Witnesses:

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Jos. L. Coombs

Norman Wiard.
Inventor:

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att'y.

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fig. 4.

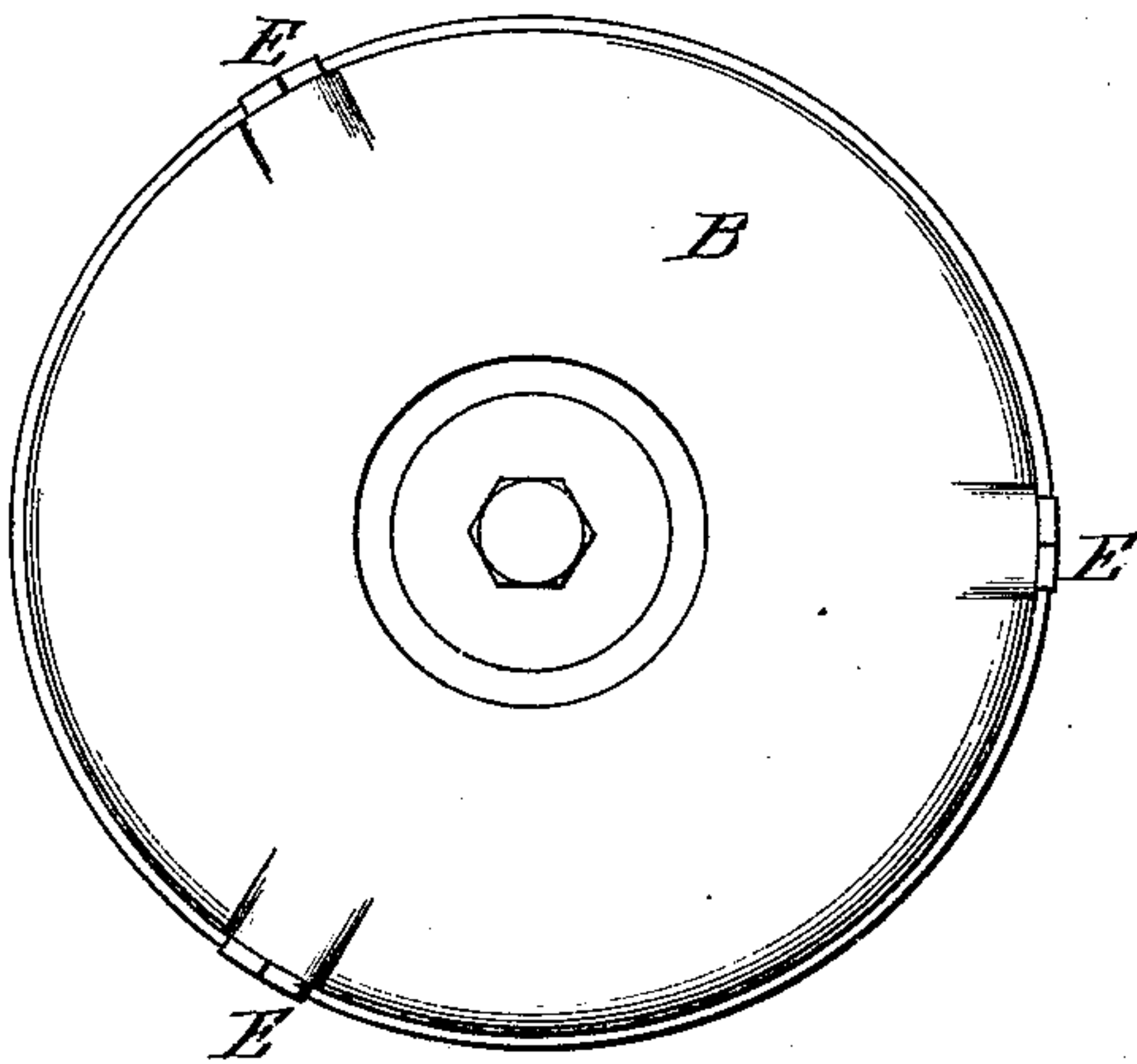


fig. 5.

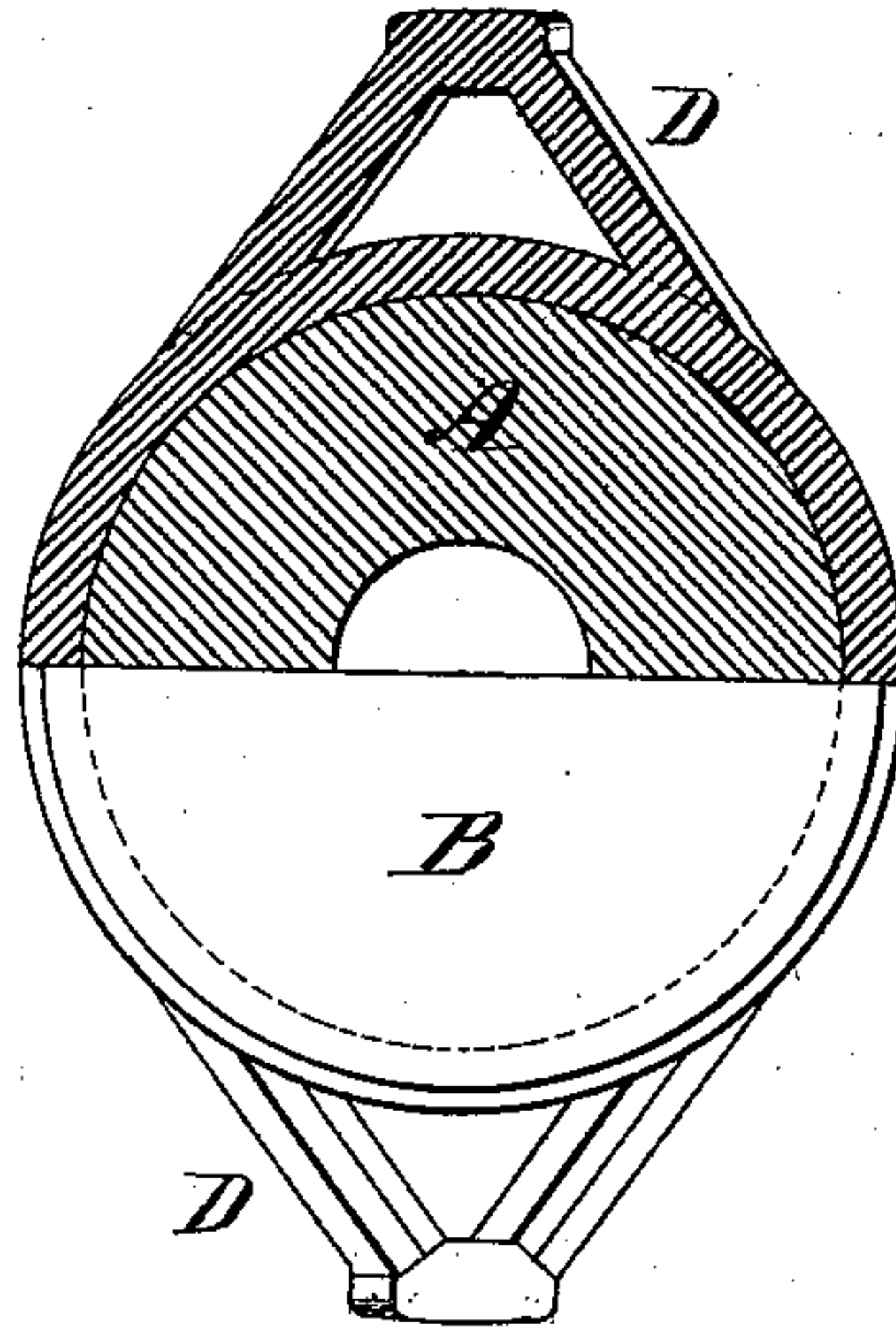


fig. 6.

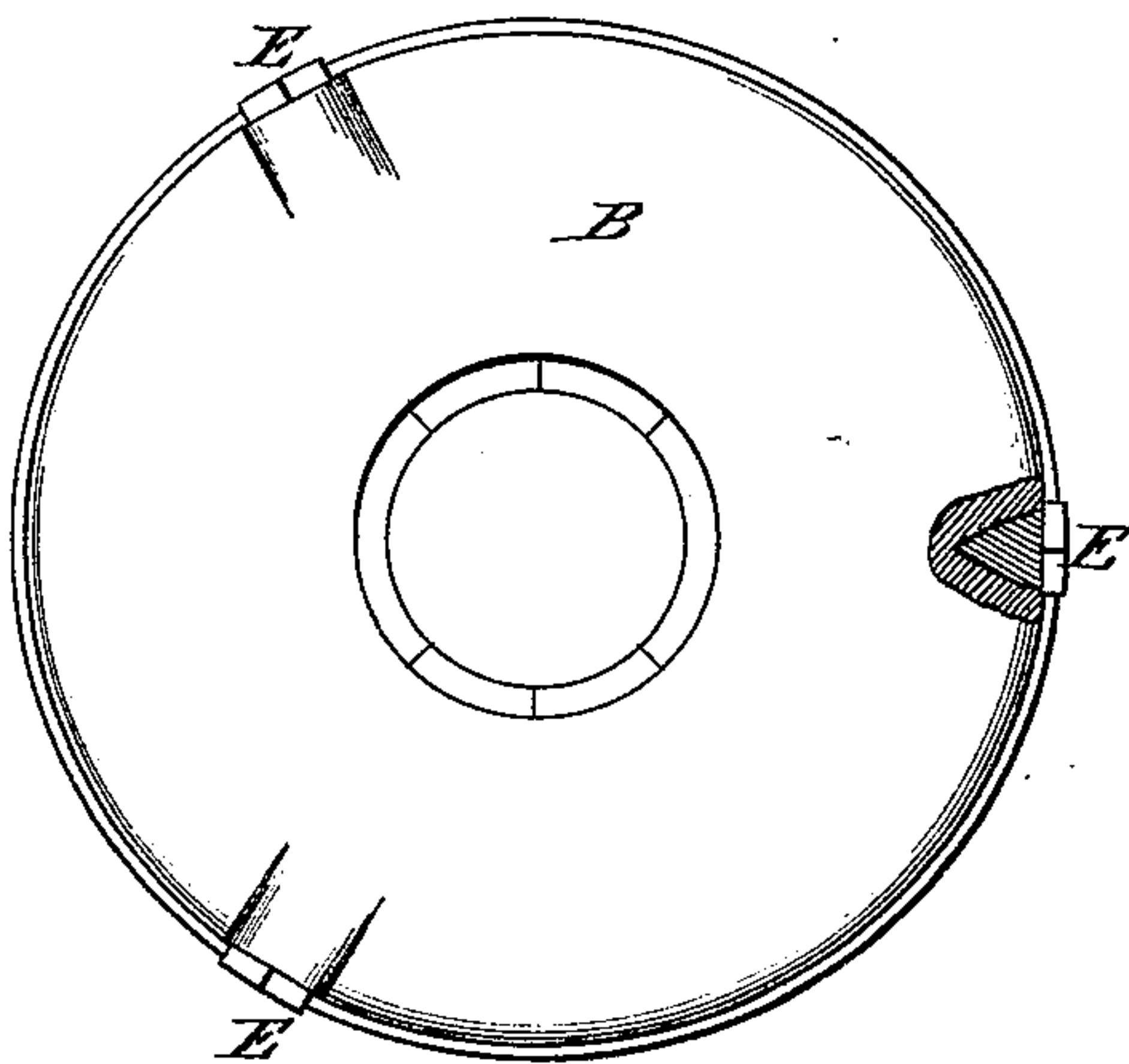
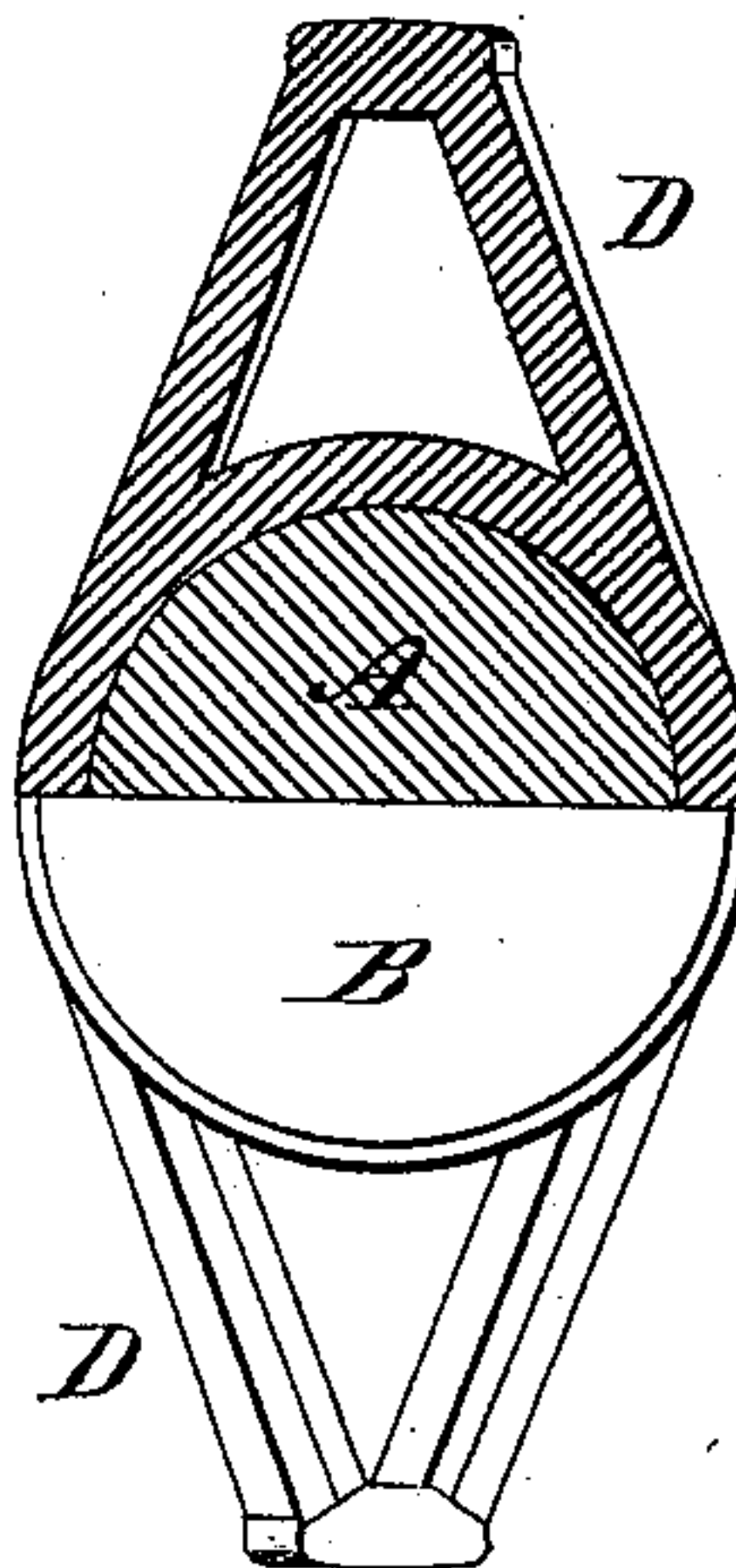


fig. 7.



Witnesses:
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UNITED STATES PATENT OFFICE.

NORMAN WIARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN SUB-CALIBER PROJECTILES.

Specification forming part of Letters Patent No. **157,049**, dated November 17, 1874; application filed August 18, 1874.

To all whom it may concern:

Be it known that I, NORMAN WIARD, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Sub-Caliber Shot and Shell, of which the following is a specification:

My invention consists in certain improvements in the construction of projectiles for heavy ordnance, or a sub-caliber shot or shell having a diameter smaller than the diameter of the bore of the gun, so constructed that during its passage out of the gun its axis will be in a line with the longitudinal axial line of the bore. The projectile is supported axially in the axial line of the gun at two parts—viz., about midway between the two ends, and at the rear, the rear being enlarged so as to nearly fill the bore to prevent windage, the central supports consisting of two or more "gibs" or wings, which also serve to follow the grooves of the gun, and impart a rotary motion to the projectile. The gibbs or wings are made of soft metal, and so constructed that they will strip or wipe off when the projectile enters an object on a line with the largest diameter of the front end of the same, so as not to affect its penetration, and in the case of solid shot, which are intended to pass or penetrate entirely through an object, the rear portion of the projectile is so constructed as to drop off after the shot leaves the gun, as will be hereinafter described.

The object of my invention is to reduce the friction of the shot in passing out of the gun to a minimum with the least possible windage, and at the same time keep its axial line directly in the axial line of the bore without any liability to upset and crowd or injure the bore. By thus reducing the friction the projectile is caused to slide smoothly out of the gun, and nearly the whole force of the powder is expended upon the projectile, instead of being stored up in the same, causing comparatively little strain upon the gun.

Projectiles as heretofore constructed for rifled guns have necessarily been made considerably smaller than the bore of the gun to facilitate loading, and have been provided with soft-metal bands or sabots to take the grooves, so as to impart the proper rotary motion to the shot or shell. As thus constructed, when introduced in the gun, the axial line of the pro-

jectile will be lower than the axial line of the bore, as the projectile will rest upon the lower side of the bore, and as the shot is started by the force of the explosion behind it, it is almost invariably upset and crowded or jammed in the bore, giving rise to great friction as it passes out, invariably injuring the gun, and sometimes causing it to burst.

My invention is intended to obviate these defects; and it consists in a shot or shell of peculiar shape, cast in the ordinary manner of chilled iron and finished in a lathe, having two or more wings or gibbs cast upon it a little forward of a point midway between the two ends. The said wings are of soft metal, that will not injure the grooves of the gun, and are made in skeleton form, in order to pass freely through the air, so as not to obstruct the flight of the projectile, and are beveled at their edges, so as to cut the air. The rear of the shell is enlarged, so as to nearly fill the bore, and is surrounded by a band giving proper windage. This rear portion is supported axially in the bore by means of three or more projections arranged at equal distances apart around its circumference. The projections are of soft metal, and fit snugly against the sides of the bore, and hold the projectile in place. The rear of the projectile, when in the form of a solid shot, is made separate, and is attached by means of a screw, in such a manner that the rotary motion of the shot will detach and drop it in its flight, so that it will not interfere with the penetration of the shot. The wings or gibbs in the case of both shot and shell will be removed in a line with the greatest diameter of the front end of the same on passing through an object for the same purpose.

In the drawings, Figure 1 represents a view, partly in section, of a shell constructed according to my invention. Fig. 2 is a similar view of a solid shot. Fig. 4 is a rear view of the shell. Fig. 5 is a partly a transverse section and partly an end view of the shell. Fig. 6 is a rear view of a solid shot, and Fig. 7 is partly a transverse section and partly an end view of a solid shot.

A represents the body of the shot or shell, cast in the ordinary manner, of chilled iron or made of steel, considerably smaller in diameter in the center, but approaching more nearly

the diameter of the bore of the gun at each end. The rear B is somewhat larger than the front end, and is surrounded by a windage-band, C. The shell or shot, after casting, is finished up in a lathe, and the wings or gibs D D are then formed on the projectile. These are formed of soft metal, and are fastened on in any convenient manner. They are of skeleton form, as shown in Figs. 5 and 7, and their front and rear edges are beveled or made in the shape of knife-edges. To the rear of the projectile are secured three or more soft-metal projections, E E E, cast or formed around its periphery, or otherwise attached at equal intervals. These serve to support the projectile in line with the axial line of the bore. The rear portion of the solid shot represented in Fig. 2 is made separate from the main body, and is secured thereto by means of a screw formed upon the shot, which fits into a threaded recess in the rear portion. This construction allows the said rear portion to be detached after the shot leaves the gun, the rotary movement imparted to the shot by the rifle-grooves unscrewing the parts, so that it will offer no impediment to the shot in passing through an object.

The operation of my invention will be readily understood. The shot or shell is forced into the bore of the gun, the gibs or wings taking and following the grooves. The projectiles E E E on the rear of the projectile keep that portion truly centered, while the gibs or wings center the forward part of the projectile.

It will be seen that the projectile is thus supported at two places in a true axial line with the axial line of the bore, and that it will be impossible for the explosion to tip or upset it. As it is supported there will be comparatively little friction in passing out of the gun, thus obtaining the full effect of the explosion in the proper direction. The gibs or wings, when the projectile enters an object, will be stripped partially off, as before stated, to allow it to penetrate; and in the case of a solid shot the enlarged rear portion will drop entirely off during its flight for the same purpose.

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

1. A sub-caliber projectile enlarged at the front and rear, and provided with wings or gibs adapted to take the grooves of the gun and support the front portion of the projectile, so that its axis shall coincide with that of the bore, substantially as described.

2. In combination with a projectile, the gibs or wings to take the grooves of the gun and impart rotation to the shot, so constructed that they will be partially stripped or wiped off when the shell enters an object to allow it to penetrate, as herein described.

In testimony that I claim the foregoing I have hereunto set my hand.

NORMAN WIARD.

Witnesses:

ALBERT H. NORRIS,
JAMES L. NORRIS.