

C. DAVIS.
 CONTOUR CAP FOR PROJECTILES.
 APPLICATION FILED APR. 21, 1908.

945,492.

Patented Jan. 4, 1910.
 3 SHEETS—SHEET 1.

Fig. 1.

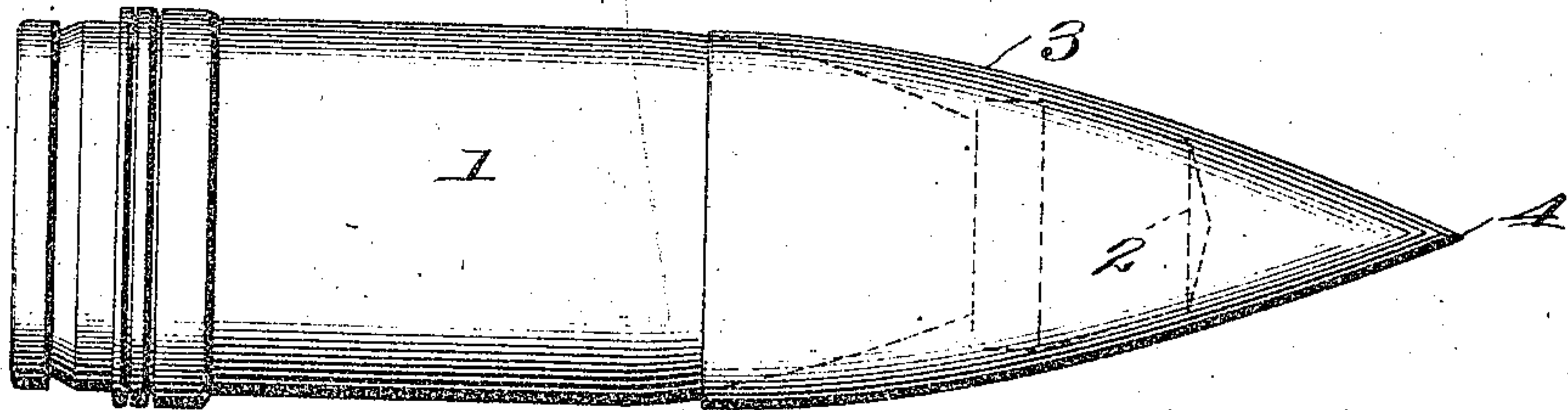


Fig. 2.

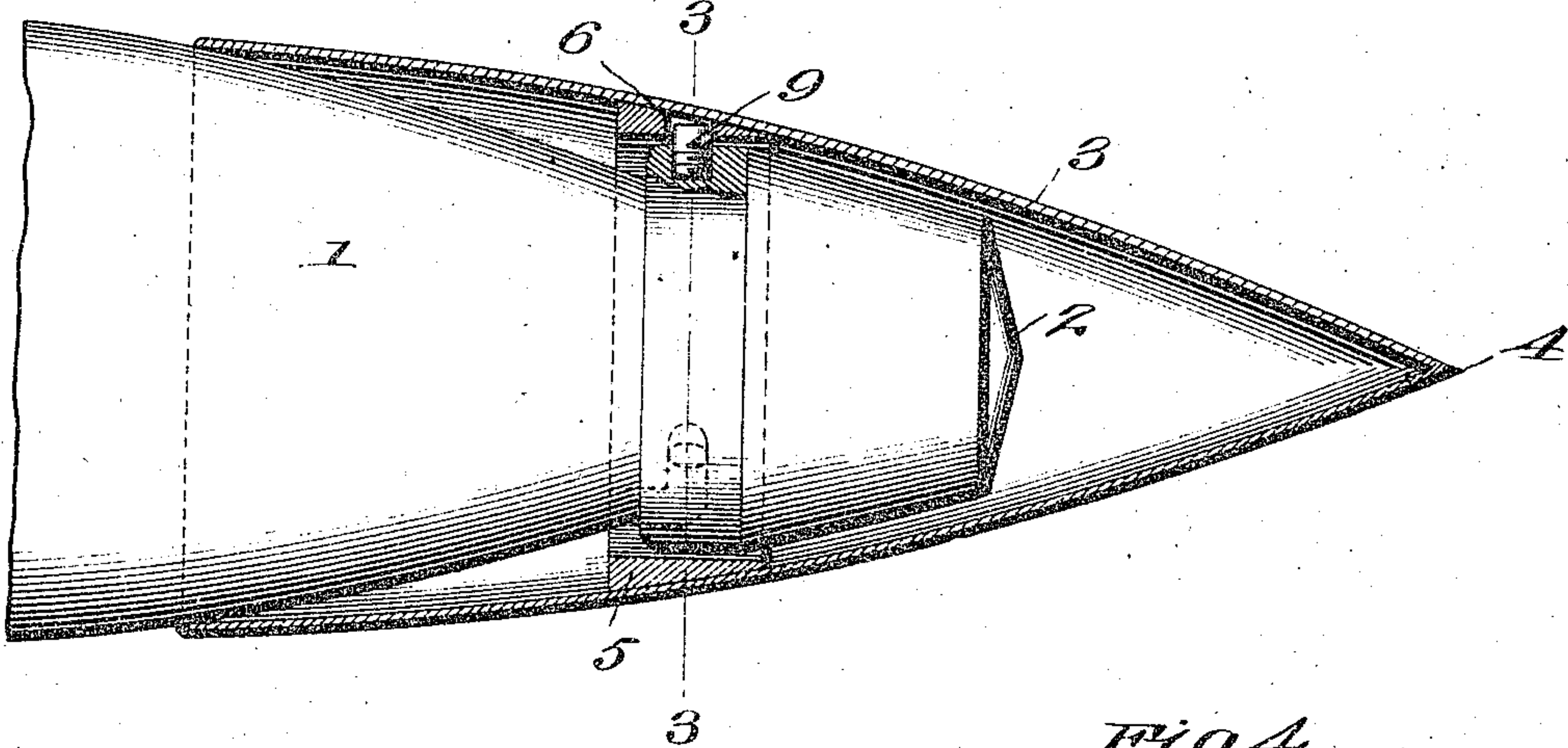


Fig. 3.

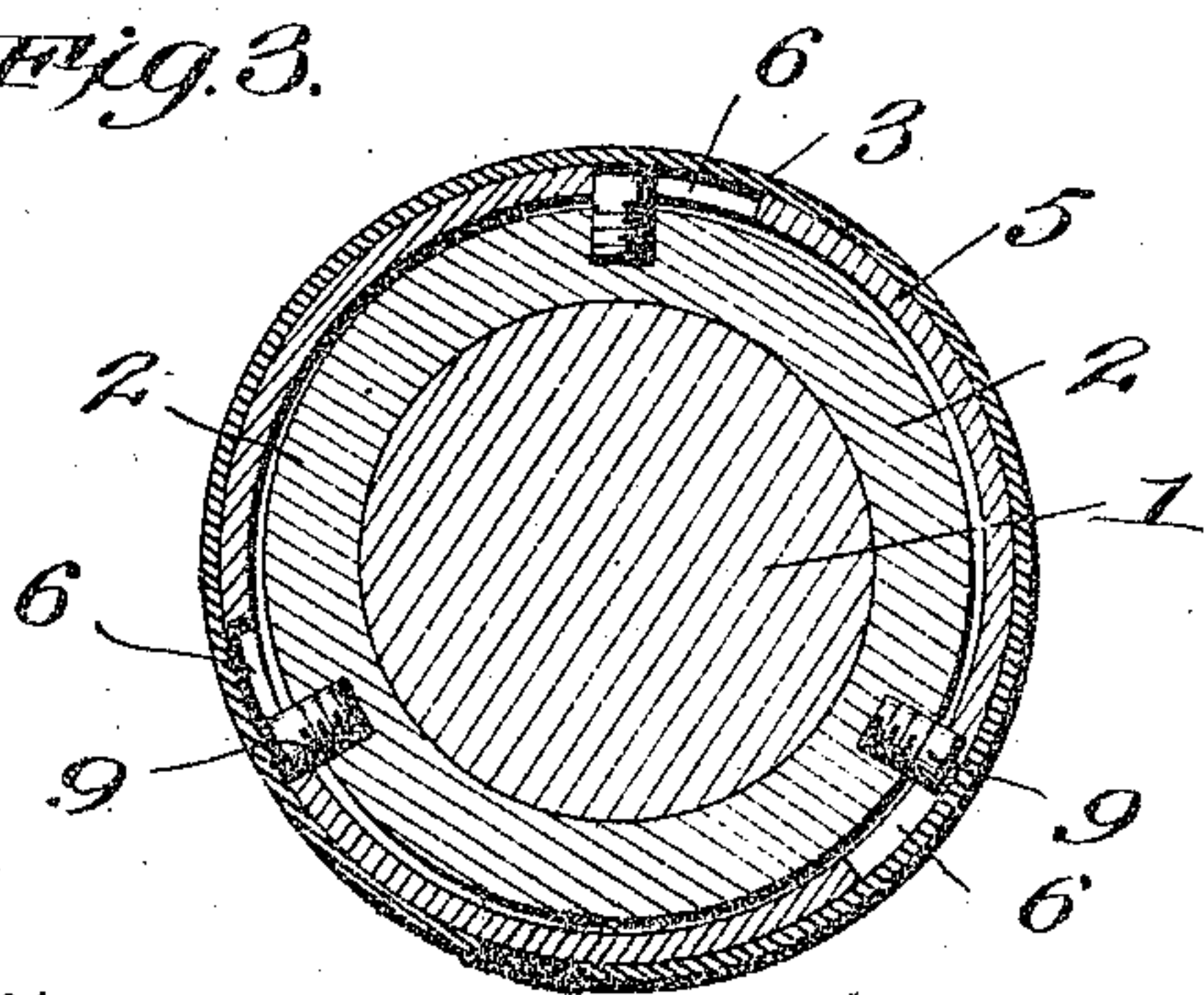
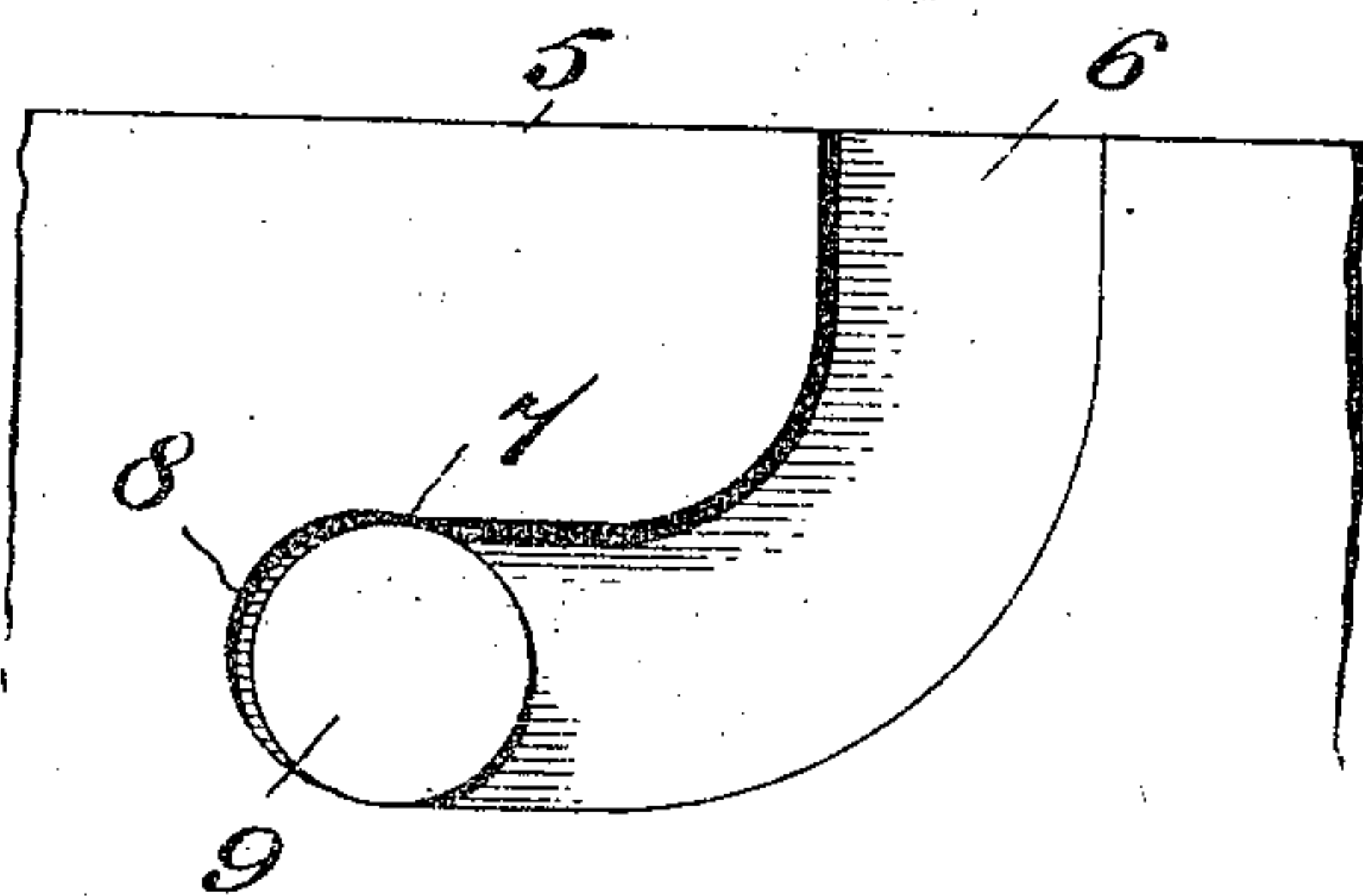


Fig. 4.



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Fig. 5.

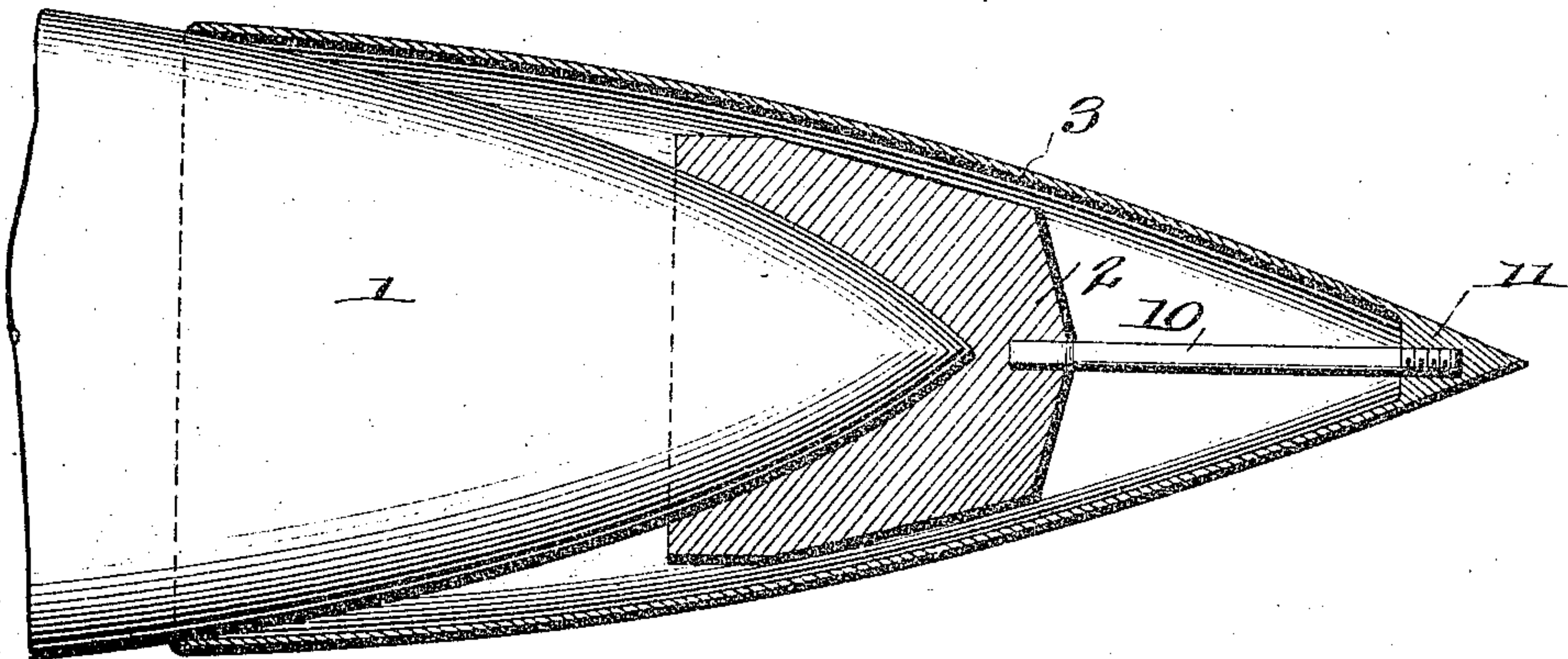


Fig. 6.

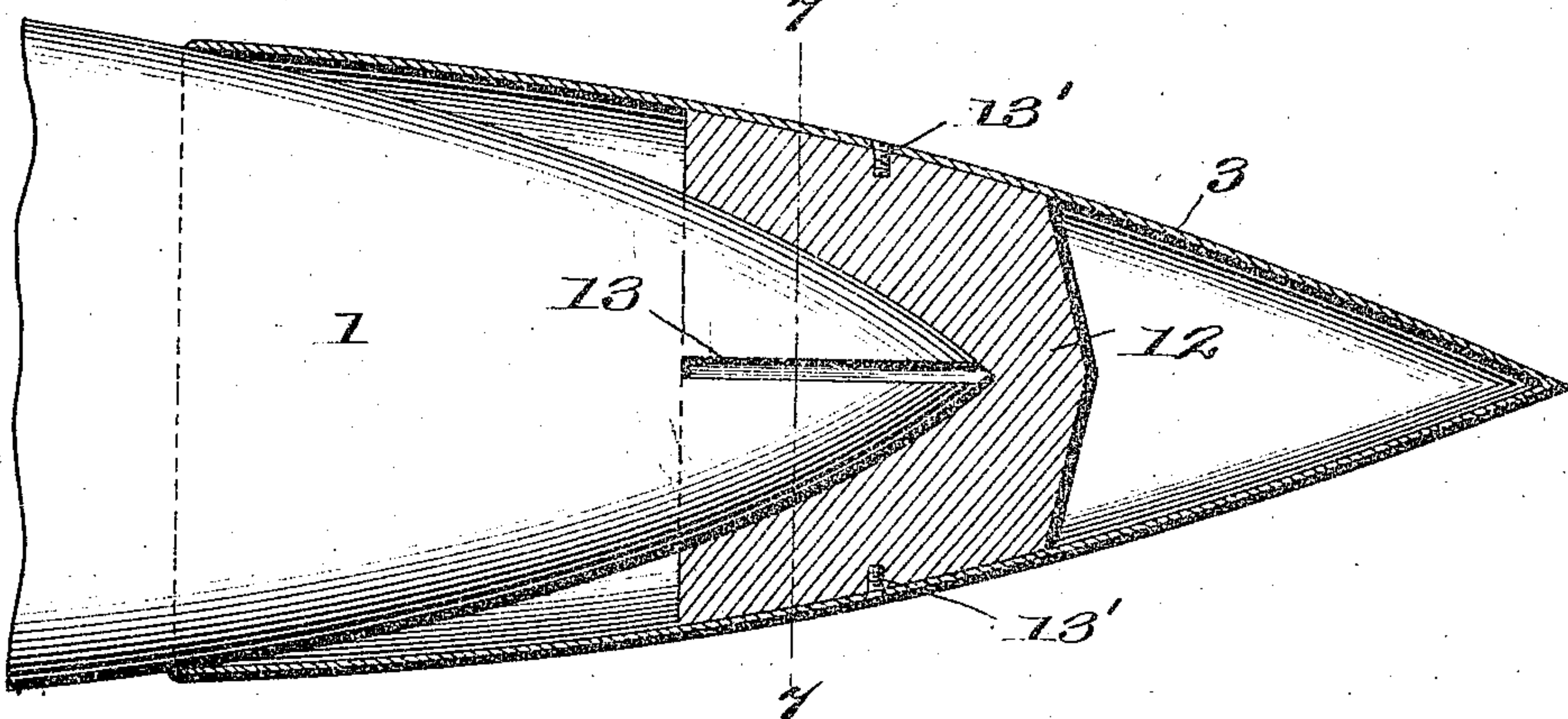
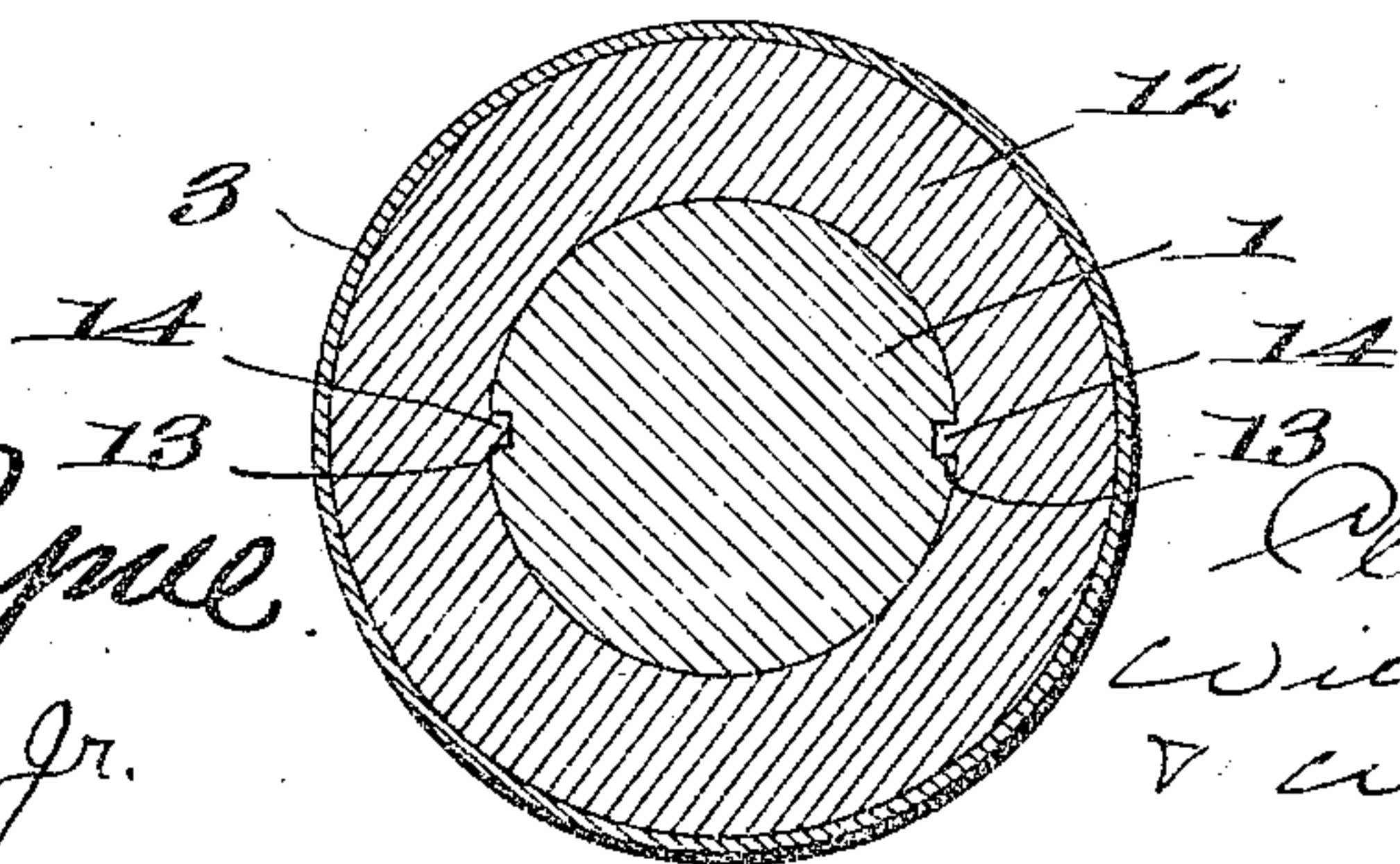


Fig. 7.



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 3 SHEETS—SHEET 3.

Fig. 8.

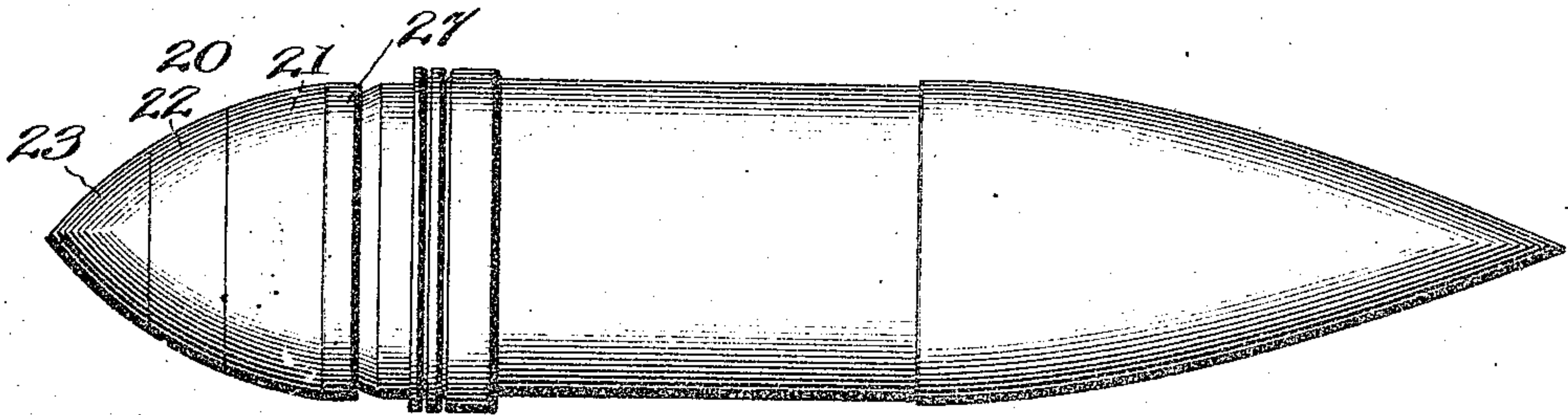
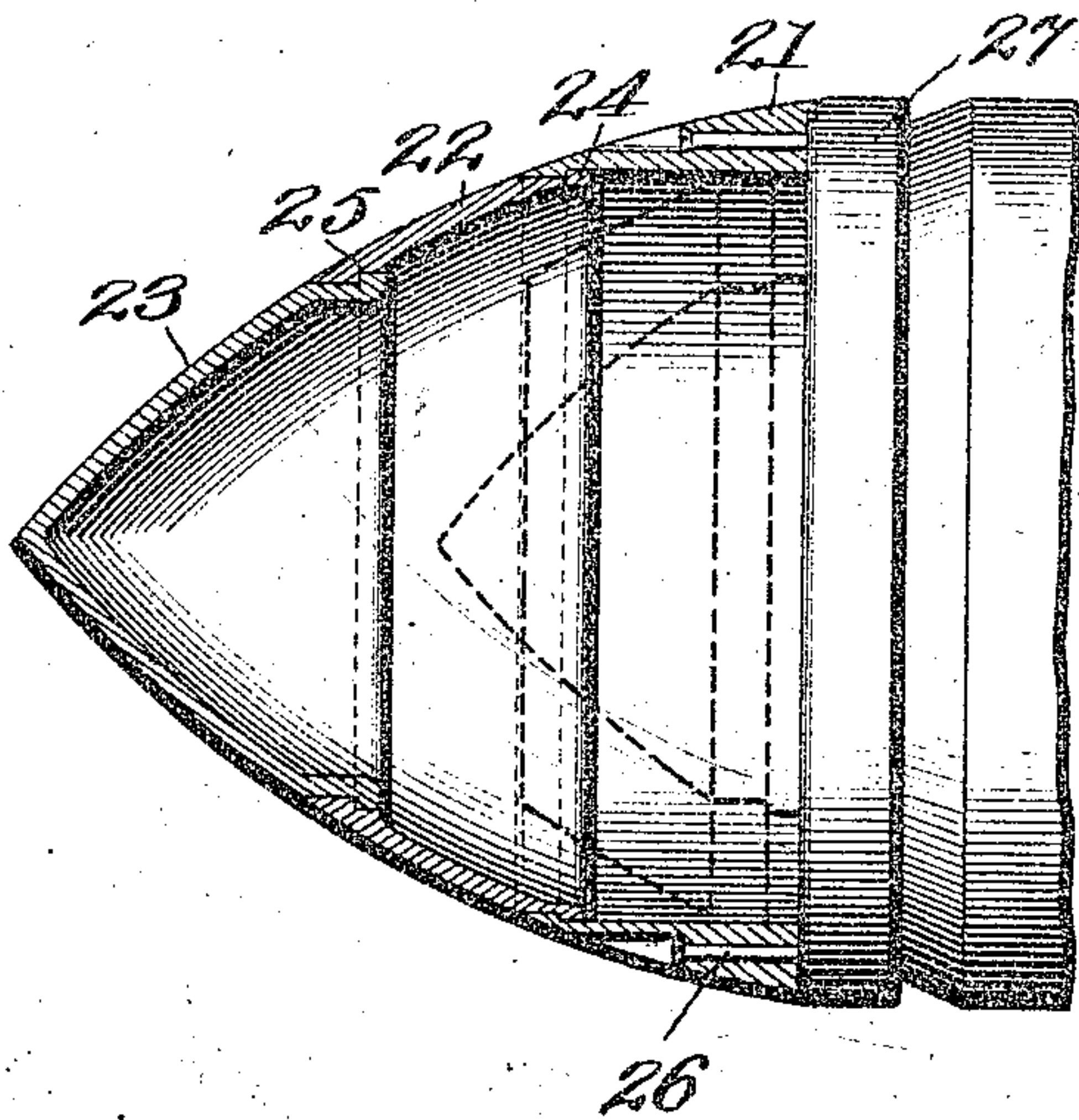


Fig. 9.



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UNITED STATES PATENT OFFICE.

CLELAND DAVIS, OF THE UNITED STATES NAVY.

CONTOUR-CAP FOR PROJECTILES.

945,492.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed April 21, 1908. Serial No. 428,403.

To all whom it may concern:

Be it known that I, CLELAND DAVIS, lieutenant-commander U. S. Navy, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Contour-Caps for Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to contour caps for projectiles, and has for its object the provision of such a cap as will decrease the air resistance of modern standard projectiles, and therefore increasing their velocity and accuracy during flight.

It is now well known that there is a certain contour, or taper, which when given to the exterior of projectiles, causes them to meet with a minimum resistance from the air; and it is equally well known that this particular contour, or taper is not the best adapted for armor piercing qualities. In other words, if a projectile is given the best shape for piercing armor, it will not meet with a minimum air resistance during flight, and if it is given the best shape for cleaving the air, it will not possess its best armor piercing qualities.

My invention accordingly consists in providing a standard armor piercing or other projectile with a contour cap, which will during flight give the projectile as a whole that contour best adapted for penetrating the air, and which upon impact is destroyed, thereby leaving the projectile with its best armor piercing contour unimpaired.

Referring to the accompanying drawings forming a part of this specification in which like numerals refer to like parts in all the views:—Figure 1, is an elevational view of a standard capped armor piercing projectile with my contour cap applied thereto. Fig. 2, is a like view of the forward end of the projectile showing the cap in section. Fig. 3, is a section on the line 3—3 of Fig. 2. Fig. 4, is a detail of the bayonet slot for securing the cap to the projectile. Fig. 5, shows a modified means for securing the contour cap to the projectile. Fig. 6, a further modified form of my invention. Fig. 7, a section along the line 7—7 of Fig. 6. Fig. 8, a still further modified form,

and Fig. 9, a detail view of the collapsible cap attached to the base of the projectile, showing the cap in section, in full lines, when extended, and in dotted lines when collapsed.

1, indicates the body of a standard projectile; 2, the well known soft metal cap with which such projectiles are commonly provided; and 3, my contour cap made of any suitable material such as sheet metal for example, and, the outer surface of which for a six inch projectile should have a radius of about thirty-six inches, or about six diameters of the projectile. The apex 4 of such a curved conoidal cap will extend about four inches in front of the soft metal cap 2, and will give the contour, shown in Fig. 1, to the entire projectile.

In order to secure accuracy in flight, it is essential that the cap 3, be securely centered on the projectile, and with its apex 4 in prolongation of the axis of said projectile. To accomplish these ends, I secure in any suitable manner, as by screws or by autogenous welding, the band 5 on the interior of the cap 3, and provide the same with the bayonet slots 6, having the shoulders 7, formed by slightly turning up the extreme ends 8 of the slots, as shown. The soft metal cap 2, is provided with the pins 9, adapted to enter the slots 6, and to be forced past the shoulders 7 when the contour cap is hard over, and thereby lock the latter firmly to the projectile. Since the rotary motion of the projectile is right handed, when viewed from the rear, the slots 6 are turned in the same direction so the pins 9 will tend to tighten the joint between the cap 3 and projectile after firing. The band 5, is so placed longitudinally in the cap 3, that when the extreme rear edge of the cap contacts with the curved, or bourrelet portion of the projectile, as shown, the slots 6 will register with the pins 9 on the soft cap 2.

In the modification shown in Fig. 5, instead of using a bayonet joint to secure the contour cap to the projectile 1, I employ a pin or rod 10, which enters the forward end of the soft nose, and is preferably screw threaded into the solid portion 11, secured into the apex portion of the cap 3.

In the form shown in Fig. 6 the projectile cap regarded as a whole is composed of the sheet metal contour cap 3, having secured therein the soft metal cap 12 recessed at its

rear end and adapted to fit around and to laterally support the nose or point proper of the projectile. Said cap is also provided with the chambered portion between the forward end of the soft metal cap and the extreme point of the contour cap 3. In order to give the cap a firm seat on the nose of the projectile, the latter is provided with grooves 13, and the soft cap 12 is provided with corresponding projections 14, which may be wedges in said grooves, when the cap 12 is applied thereto.

In the form shown in Figs. 8 and 9, I attach to the base of the projectile a suitable removable cap which will be in a collapsed condition when under pressure and will be in an extended condition when in flight. In this form of projectile the forward contour cap 3 acts in the manner above described and the rear cap 20 acts to fill the vacuum formed at the base of the projectile while in flight. This collapsible cap may be conveniently made in a plurality of telescopic sections 21, 22 and 23, as shown, which are provided with the lugs 24 and 25, fitting corresponding grooves, and screw or other fastenings 26 are provided for securing the cap to the base 27 of the projectile as illustrated. When in their collapsed condition these sections occupy the positions indicated in dotted lines, Fig. 9, and when in flight the inertia of the parts will cause them to occupy the position shown in full lines, or a small fuse may be relied upon to generate gas to force said parts to the rear, as illustrated and described in my former application #400,595, filed November 4th, 1907, and particularly as disclosed in connection with Fig. 1, of said application. In fact the base cap, 20, of this application may be made of the form and construction disclosed in said Fig. 1, of said earlier application.

It will be observed that in all the forms shown, the contour cap may be readily and quickly attached to or detached from the projectile, thereby converting the forward contour of a standard armor piercing projectile, into that of a projectile especially designed for flight; and after the forward contour has been thus changed it may be changed back to that of the standard projectile again. The same is true of the base cap disclosed in Figs. 8 and 9. These caps may be put on at the factory and shipped with the projectiles, or they may be carried separately and applied on board ship, or at any other place of firing. The pins 9 may be readily unscrewed, and their holes filled if it is desired to do away with the contour cap altogether in the case of soft nose projectiles. It should also be observed that since my contour cap 3 is hollow, it is made of relatively thin metal, and involves the adding of practically no weight forward of

the piercing point of the ordinary projectile, that I do not disturb to any appreciable extent the distribution of weights already existing in standard projectiles, when it is used alone, and as I very slightly weight it to balance the rear cap if desired, I do not interfere with ballistics of the projectile at all.

I am aware that hollow caps have been heretofore proposed for projectiles having abrupt, highly air resisting forward ends, in order to lessen the resistance of the air during flight; but such caps are in no sense the equivalent of mine, for that the shape necessary to obtain a minimum resistance during flight, not being then unknown, the contour essential for the accomplishment of my results was neither shown nor otherwise disclosed, and therefore such caps were incapable of giving the correct contour to the projectile as a whole.

Of course I do not wish to be limited to the exact details of construction above disclosed, since it is evident that the same may be varied without departing from the spirit of my invention.

What I claim is:—

1. The combination of a pointed armor piercing projectile; a soft metal cap surrounding and supporting the point of said projectile; and a contour cap secured to said projectile having a shape adapted to give to the projectile as a whole that contour best adapted for piercing the air with the minimum resistance and said contour cap when in position on the projectile leaving a hollow space between its extreme forward point and the forward point of said soft metal cap, substantially as described.

2. The combination of a pointed armor piercing projectile; a soft metal cap surrounding and supporting the point of said projectile; a conoidal contour cap struck with a radius of substantially six diameters of the projectile; and means for so securing said contour cap to said projectile as to leave a chamber between the front of said soft metal cap and the extreme point of said contour cap, substantially as described.

3. The combination of a standard projectile provided with pins; a soft metal cap covering and laterally supporting the point of said projectile; and a contour cap so shaped as to cause a minimum resistance through the air and provided with bayonet slots in which said pins take, said cap leaving a chamber between its extreme forward point and the forward point of the soft metal cap when in place upon the projectile substantially as described.

4. The combination of a standard projectile provided with pins, and a contour cap adapted to cause a minimum resistance through the air and provided with bayonet slots in which said pins take, and said slots

having locking shoulders past which said pins may be forced, substantially as described.

5 5. The combination of an armor piercing projectile, a forward contour cap having a radius of curvature substantially six times the diameter of the projectile, and a tapered collapsible cap at the base of said projectile, whereby a minimum resistance through the
10 air is encountered during flight, substantially as described.

6. The combination of a projectile; a soft metal cap; a forward contour cap having a shape adapted to give to the projectile as a
15 whole that contour best adapted for piercing the air with a minimum resistance; and a tapered cap attached to the base of said projectile adapted to partially fill the vacuum caused during flight, substantially as described.
20

7. An armor piercing capped projectile having a sharp nose and a cap surrounding and supporting the nose of the projectile and provided with a chambered fore portion, the lateral faces of said chambered
25 portion being gently convergent forward to approximately a point.

8. A cap for sharp pointed armor piercing projectiles having a base portion recessed to receive the tip of a projectile and
30

to support it laterally and adapted to be secured on the tip of the projectile and a chambered front portion extending approximately to a sharp point.

9. A capped armor piercing projectile the cap of which has a chamber in front of the
35 projectile point, the solid portion of the cap being distributed mainly around but not in front of the nose of the projectile.

10. A cap for a pointed armor piercing shell having a chambered front portion adapted to lie in front of the projectile point and recessed at the rear so as to fit around and laterally support the nose of the projectile, said recess extending nearly through
40 the unchambered portion of the cap.

11. A cap for pointed armor piercing projectiles having a radius of curvature of substantially six times the diameter of the projectile, and comprising a hollow pointed
45 contour portion and a portion adapted to laterally surround and inclose the projectile point.

In testimony whereof, I affix my signature, in presence of two witnesses.

CLELAND DAVIS.

Witnesses:

F. E. CHAPIN,
JOHN F. WILKINS.