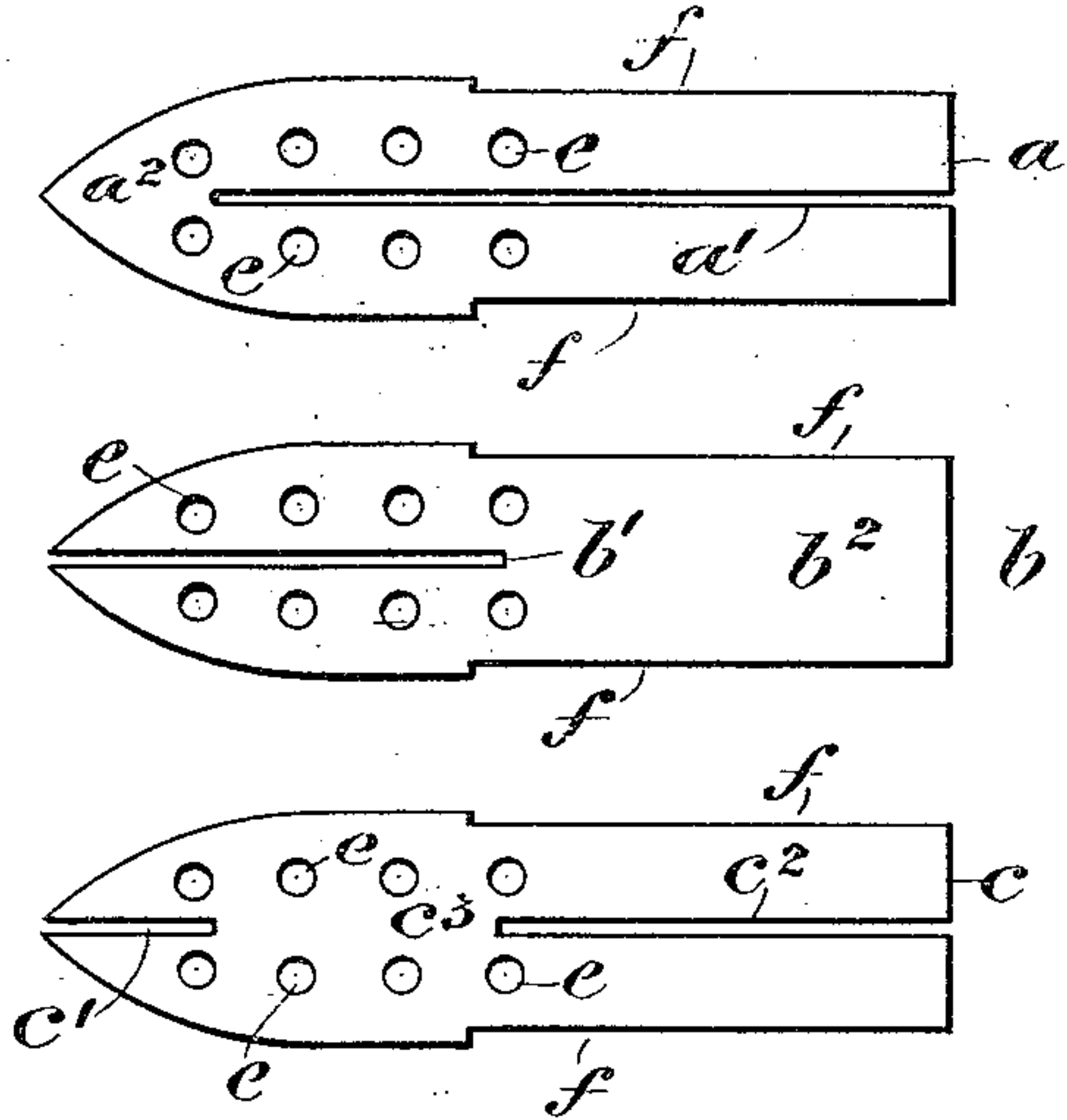


(No Model.)

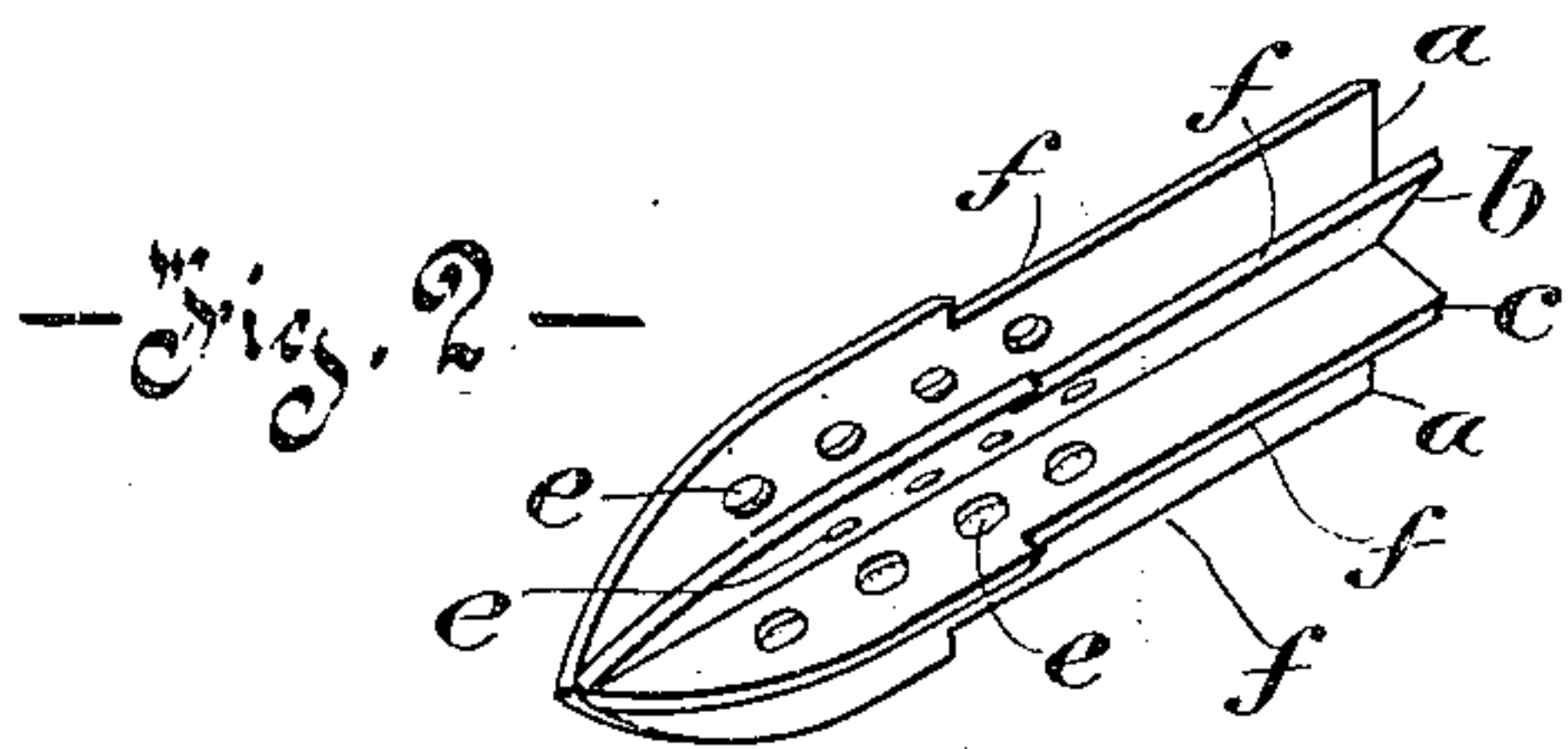
C. J. STUART.  
PROJECTILE.

No. 534,352

Patented Feb. 19, 1895.



- Fig. 1 -



- Fig. 2 -

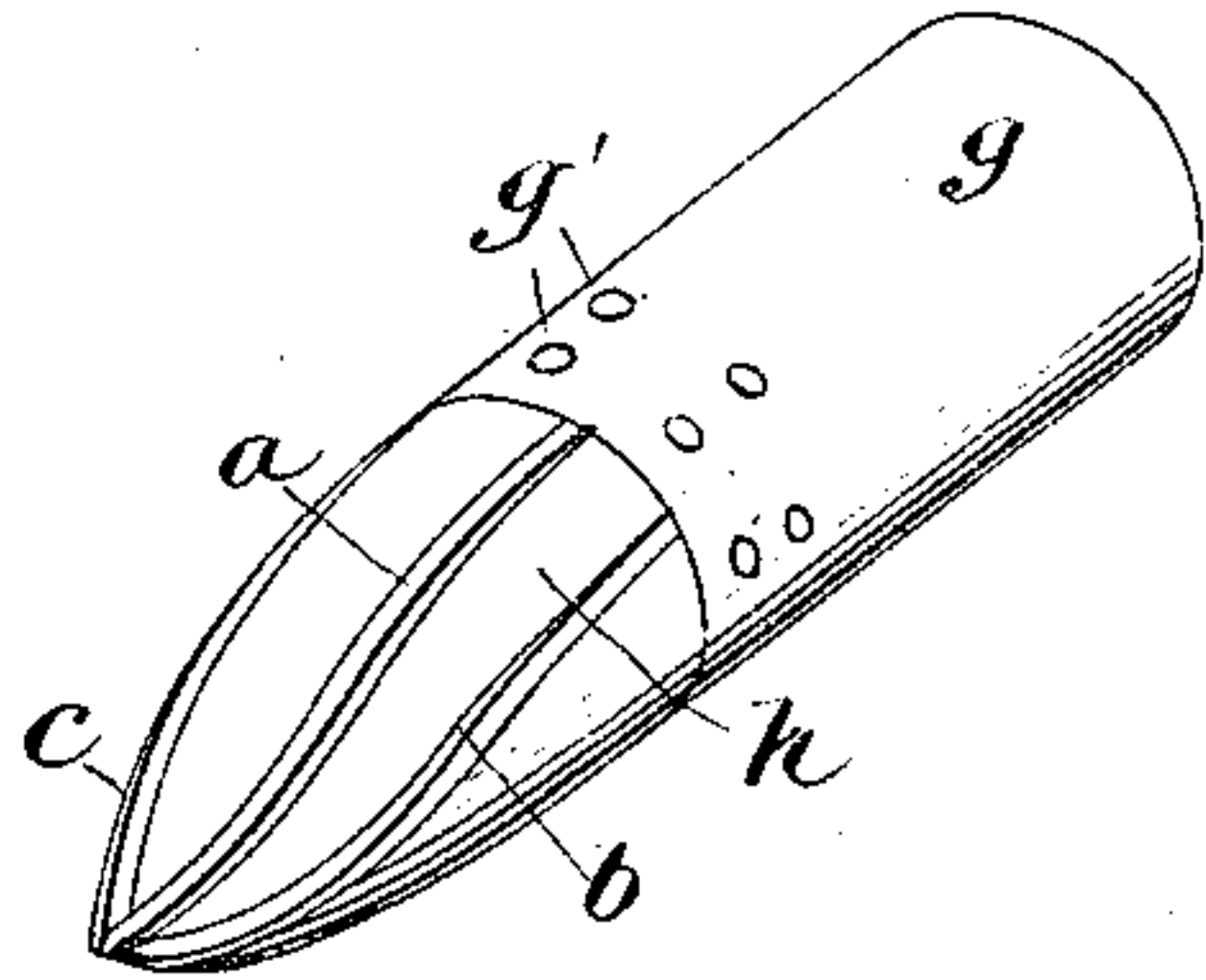
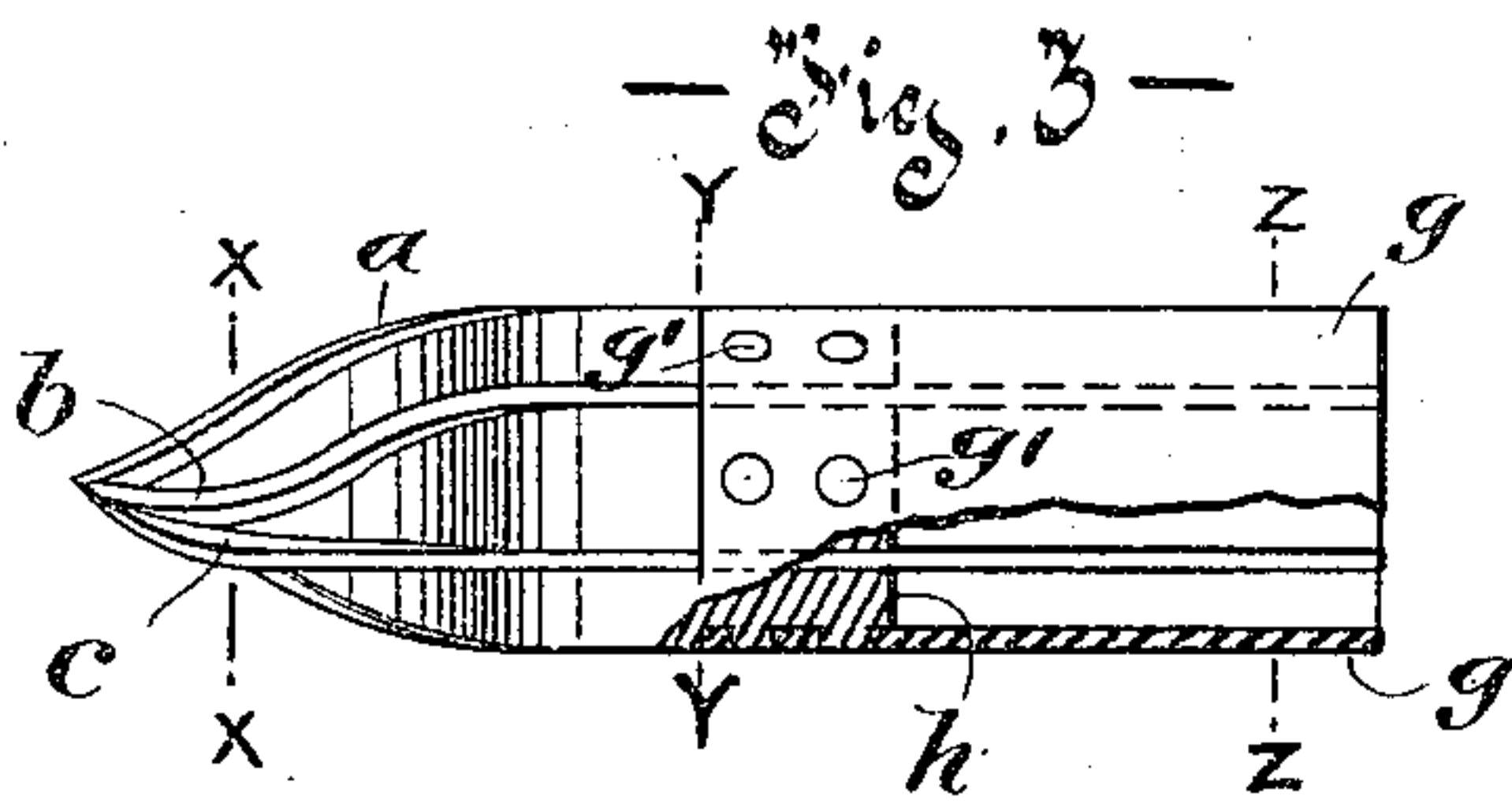
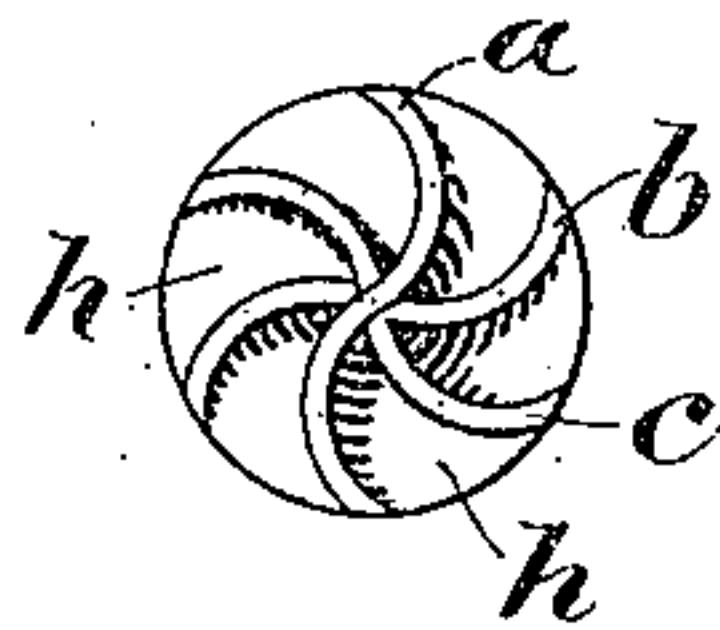


Fig. 8.



- Fig. 3 -

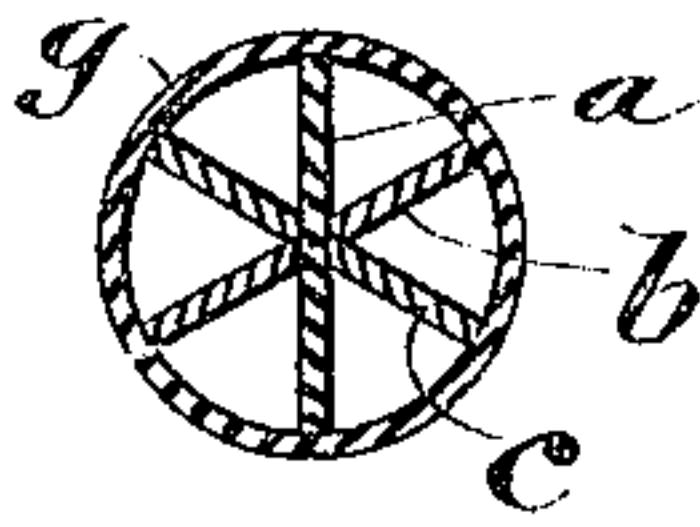
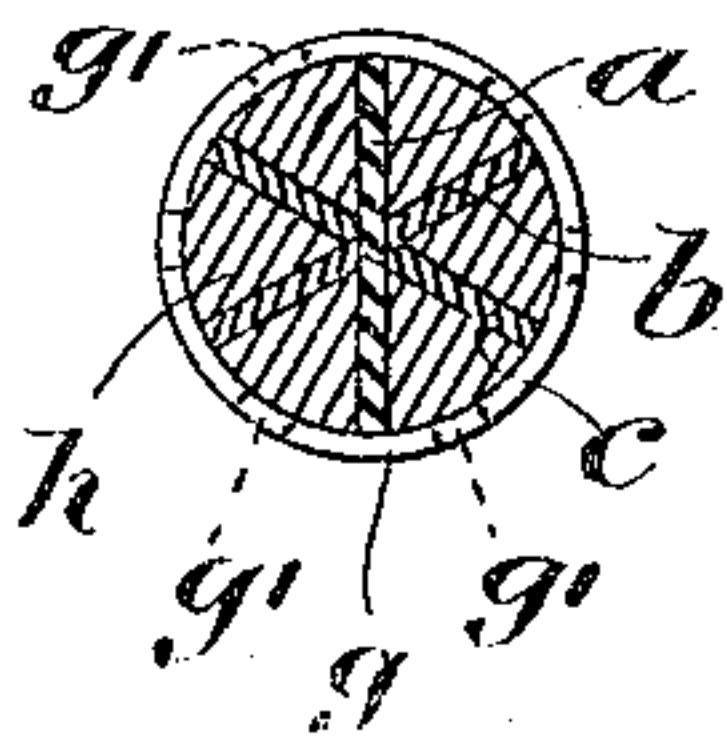
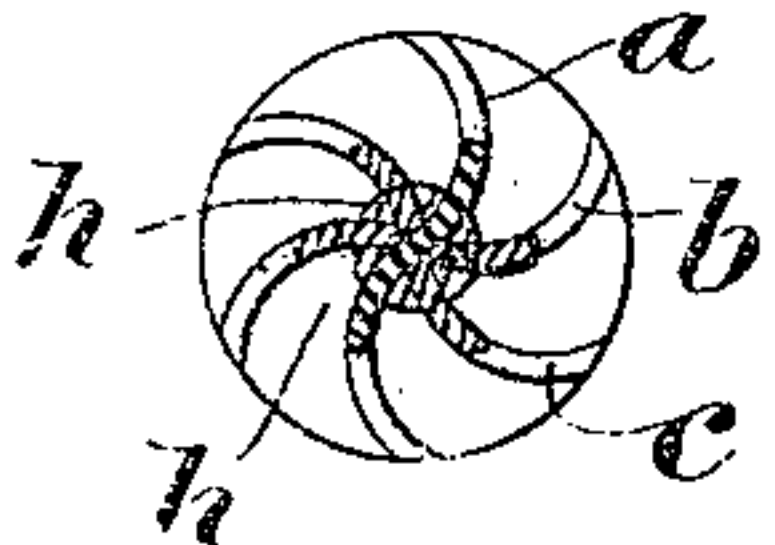
- Fig. 4 -



- Fig. 5 -

- Fig. 6 -

- Fig. 7 -



Witnesses

*[Signature]*

R. A. Sturges

Inventor

Charles Jourdean Stuart

By

his Attorney

*[Signature]*



# UNITED STATES PATENT OFFICE.

CHARLES JOURDEAN STUART, OF MONTREAL, CANADA.

## PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 534,352, dated February 19, 1895.

Application filed February 16, 1894. Serial No. 500,436. (No model.)

### *To all whom it may concern:*

Be it known that I, CHARLES JOURDEAN STUART, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Projectiles; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to projectiles of the composite type, *i. e.* composed of metals of different densities and has for its object to so construct the projectile that it will fulfill the several requirements as to the maintenance of correct position in the line of flight and the retention of its original form to secure the better penetration of the object fired at, by very simple and inexpensive structural features. These features may be briefly described as consisting of, first, the combination of a hard metal ribbed core with a dense metal filling between the ribs; secondly, the projection of the ribs of the core beyond the filling at the forward end only of the projectile; thirdly, the special construction of the core in several pieces; fourthly, the curving or bending of the projecting parts of the core to a shape calculated to insure the rotation of the projectile when traveling through the air, and, fifthly, in the extension of the core rearwardly beyond the filling and the inclosure of such extended part by a cylindrical sleeve whereby the lightening through absence of dense metal filling of the forward bend of the solid portion of the projectile shall not cause the center of gravity to be located in rear of the center of the length of the projectile but forward thereof.

For full comprehension however of the invention, reference must be had to the annexed drawings forming a part of this specification in which like symbols indicate corresponding parts, and wherein—

Figure 1 shows in plan view three separate blanks used in constructing the hard metal core of the projectile. Fig. 2 is a perspective view of a completed core. Fig. 3 is a side elevation of the complete projectile; Fig. 4, a face view; Figs. 5, 6, and 7, transverse sections of the projectile respectively on lines  $x$ ,  $y$ ,  $y$  and  $z$ ,  $z$  Fig. 3, and Fig. 8 a perspective view of the completed projectile.

As before mentioned the first feature of my invention consists in the combination of the hard metal ribbed core and the soft metal filling and I prefer to construct such core of three strips,  $a$ ,  $b$ ,  $c$ , of sheet metal (preferably steel) of the form shown in Fig. 1, one end being pointed, the other end square and each strip slitted centrally of their width the one  $a$  having a slit  $a'$  extending from the square end for about three quarters of the length of the strip and leaving an intact portion  $a^2$  at the pointed end; the strip  $b$  having a slit  $b'$  extending from the pointed end for about two thirds of the length of the strip and leaving an intact portion  $b^2$  at the square end and the strip  $c$  having short slits  $c'$  and  $c^2$  extending inward respectively from the pointed and square ends for such distances as will leave an intermediate intact portion  $c^3$  that will be located between the inner ends of the slits  $a'$  and  $b'$  of the strips  $a$  and  $b$  when the three are interlocked with each other to form the complete core as shown in Fig. 2 this being done by locating through longitudinal movement of each strip over the others the intact portion  $b^2$  of strip  $b$  in the slit  $c^2$  and the intact portion  $a^2$  of the strip  $a$  in the slit  $c'$  of the strip  $c$ . Each of these strips  $a$ ,  $b$ ,  $c$ , has perforations  $e$  through it to allow the dense metal filling as hereinafter described to pass through and bind core and filler firmly together. The strips are also cut away or narrowed as at  $f$  along each side so that the inclosing sleeve  $g$  for the rearwardly extended portion of the core will be flush with the forward edges of the core and this sleeve  $g$  also has perforations  $g'$  to receive the dense metal filling, hereinafter described in order to lock it in place.

The sleeve  $g$  is fitted in place over the rear portion of the core and in order that the forward ends of the plates forming the core may be curved or bent to the shape shown in Fig. 3, such forward end is held at the point and the body portion turned or twisted slightly this being carried out in any suitable twisting machine.

The core and sleeve having been set together and the forward end of the core twisted, the structure thus formed is set on its pointed end in a suitable mold with in-



ward projections or cores to fit into and partially fill the spaces between the forward curved parts of the core *a, b, c*, and a quantity of dense metal *h* preferably lead, in a molten condition is introduced and the structure filled up to about half its length as shown in Fig. 3, the molten metal passing through the apertures in the core plates *a, b, c*, and the sleeve *g* thus binding the hard metal core and sleeve *g* solidly together, and leaving the extreme forward portions of the core plates projecting beyond the surface of the filling for the purpose as before mentioned of securing the rotation of the projectile as it travels through the air.

If desired a cast metal core could be used instead of the core formed of several pieces as described.

What I claim is as follows:

1. A projectile having a body composed of a ribbed core of hard metal and a filling of denser metal for the purpose set forth.

2. A projectile having a body composed of a ribbed and perforated core of hard metal and a filling of denser metal for the purpose set forth.

3. A projectile having a body composed of a radially ribbed core of hard metal and a filling of denser metal for the purpose set forth.

4. A projectile having a body composed of a radially ribbed core of hard metal and a filling of denser metal the ribs being perforated for the purpose set forth.

5. A projectile having a plain cylindrical body, a conoidal forward end and rib projections extending from the extreme forward point of such end rearward and diminishing toward the cylindrical body where they terminate flush with the surface of same for the purpose set forth.

6. A projectile having a plain cylindrical body, a conoidal forward end and curved rib projections extending from the extreme forward point of such end rearward and diminishing toward the cylindrical body where

they terminate flush with the surface of same for the purpose set forth.

7. A projectile having a core composed of a number of hard metal plates slitted to interlock with each other and a metal filling to bind the whole together.

8. A projectile having a core composed of a number of hard metal plates slitted to interlock with each other and perforated to allow a metal filling to pass through each plate and bind the whole together.

9. A projectile having a core composed of a number of elongated metal plates slitted longitudinally to interlock with each other and perforated to allow a metal filling to pass through and bind the whole together as set forth.

10. A projectile having a core composed of a number of elongated metal plates slitted longitudinally to interlock with each other and perforated to allow a metal filling to pass through each plate and bind the whole together, and curved or twisted from their forward end rearward as set forth.

11. A projectile having a radially ribbed core, of hard metal, a dense metal filling for the forward half of the projectile and an inclosing sleeve for the rear portion thereof, the core and sleeve being perforated and united by the dense metal filling entering the perforations in each as set forth.

12. A projectile having a radially ribbed core of hard metal, a dense metal filling for the forward half of the projectile, portions of such core projecting beyond the filling at the forward end of the projectile and forming curved rib projections, and an inclosing sleeve for the rear portion thereof, the core and sleeve being perforated and united by the dense metal filling entering the perforations in each as set forth.

CHARLES JOURDEAN STUART.

Witnesses:

WILL P. McFEAT,  
FRED. J. SEARS.