

C. H. SAYRE.

Projectile.

No. { 3,027, }  
34,031. }

Patented Dec. 24, 1861.

Fig. 1.

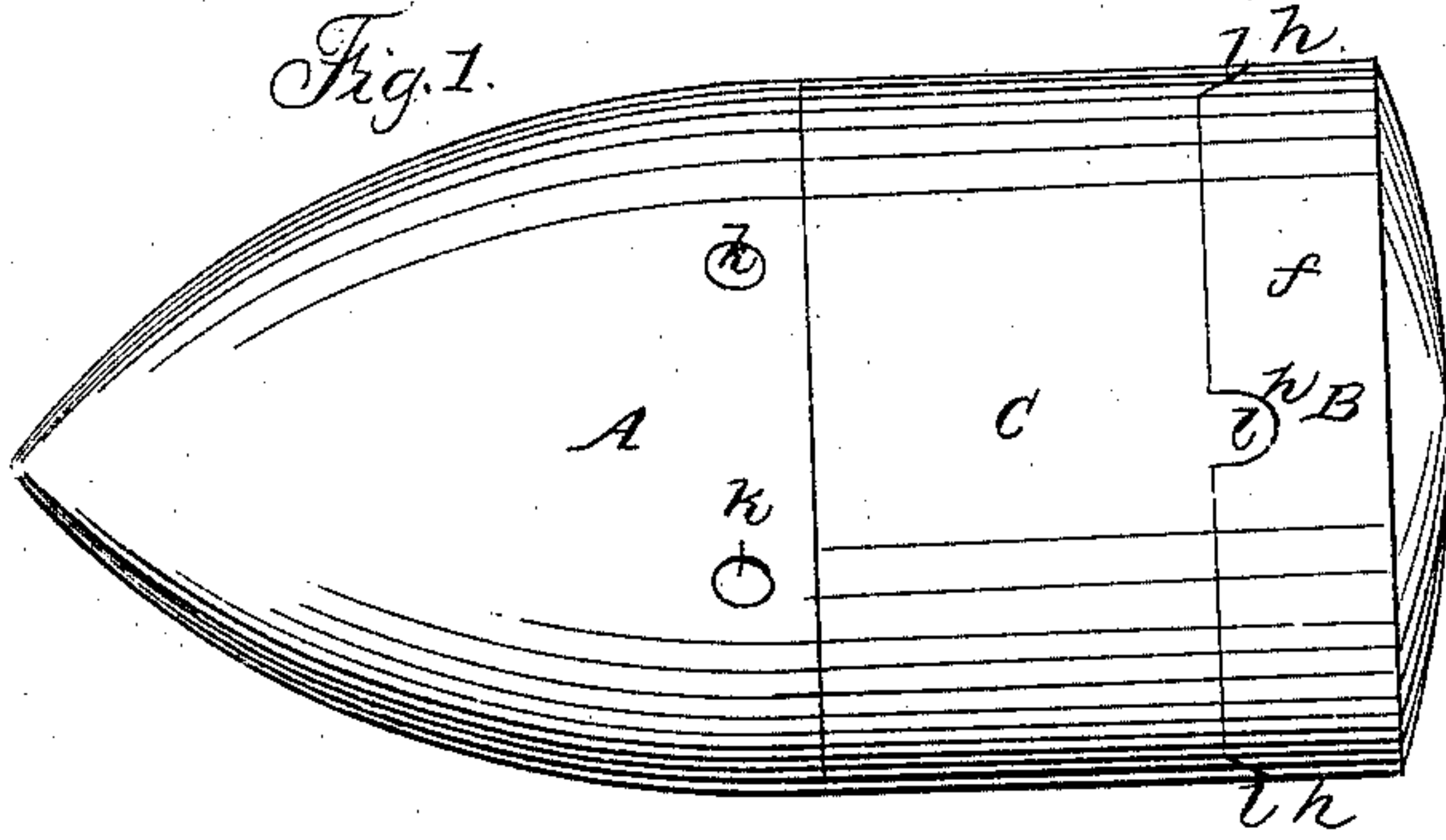


Fig. 2.

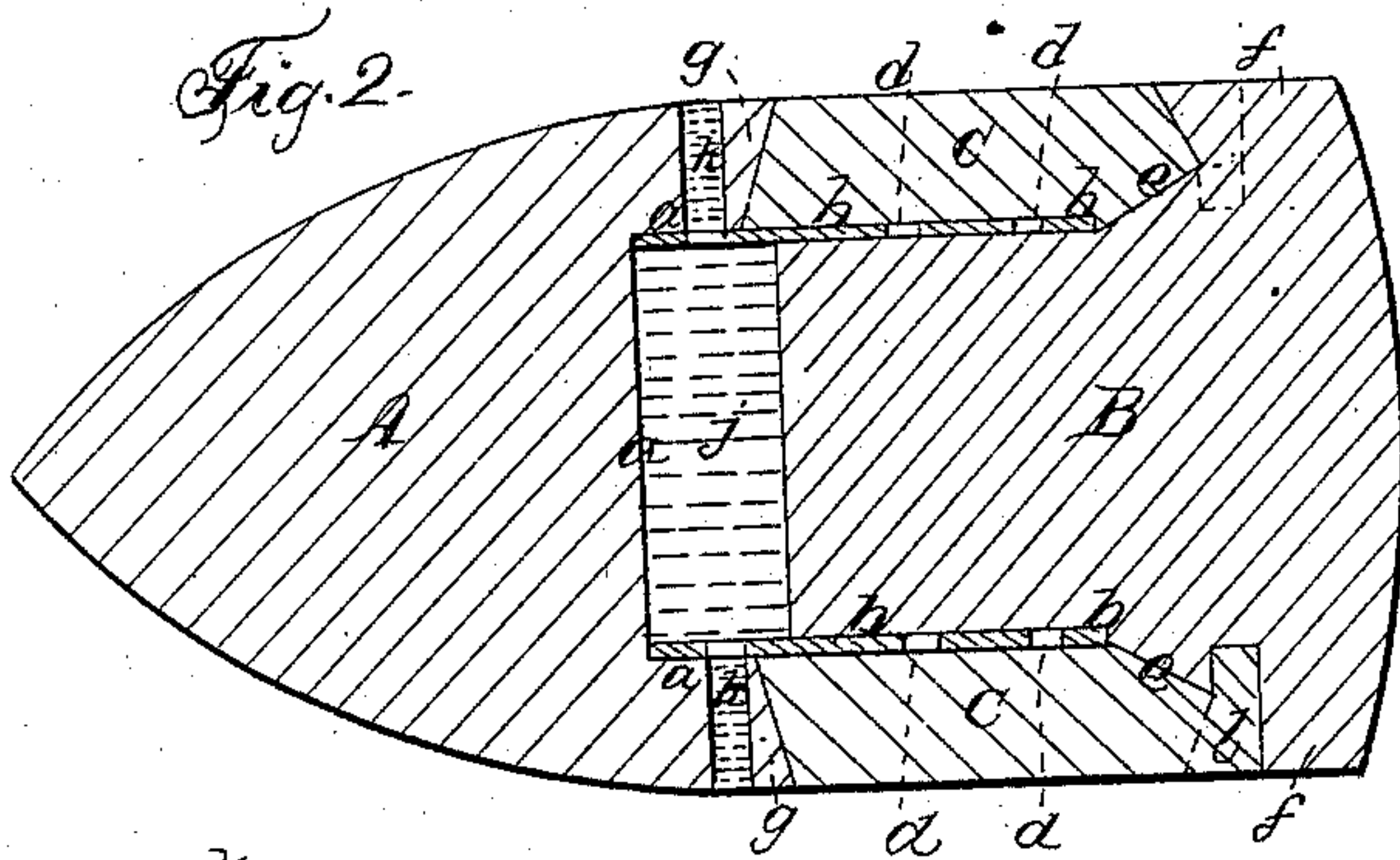


Fig. 3.

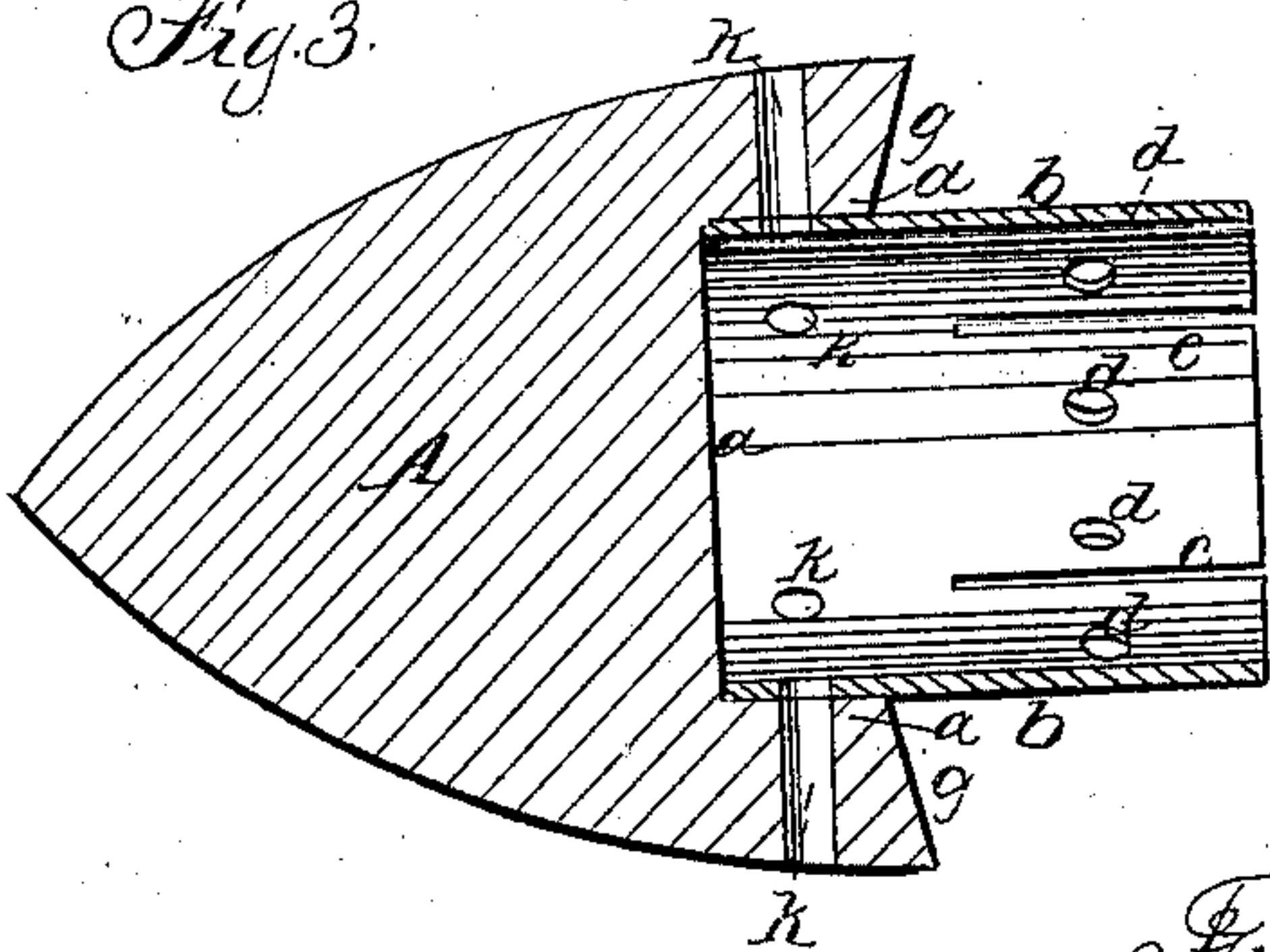


Fig. 4.

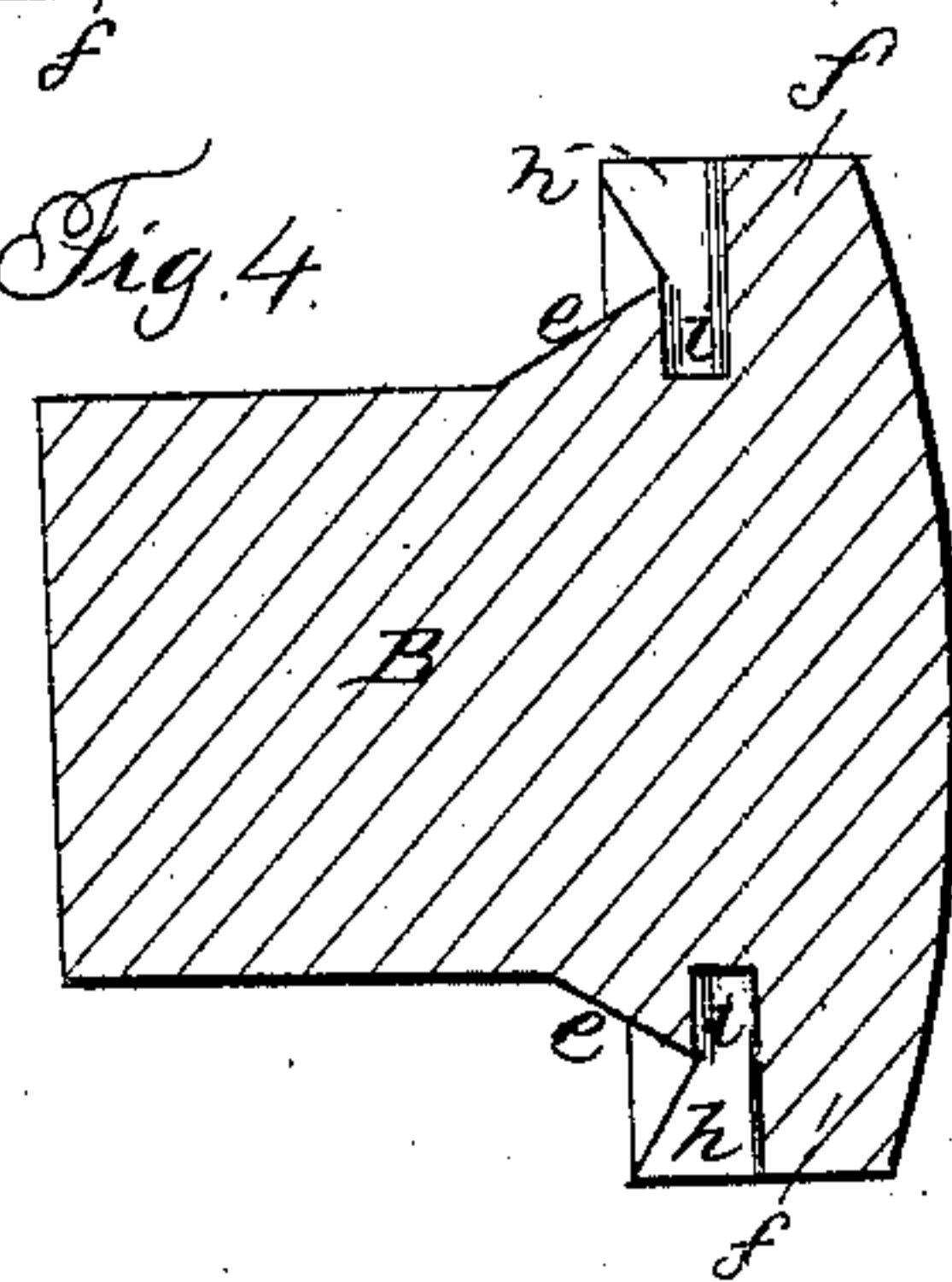
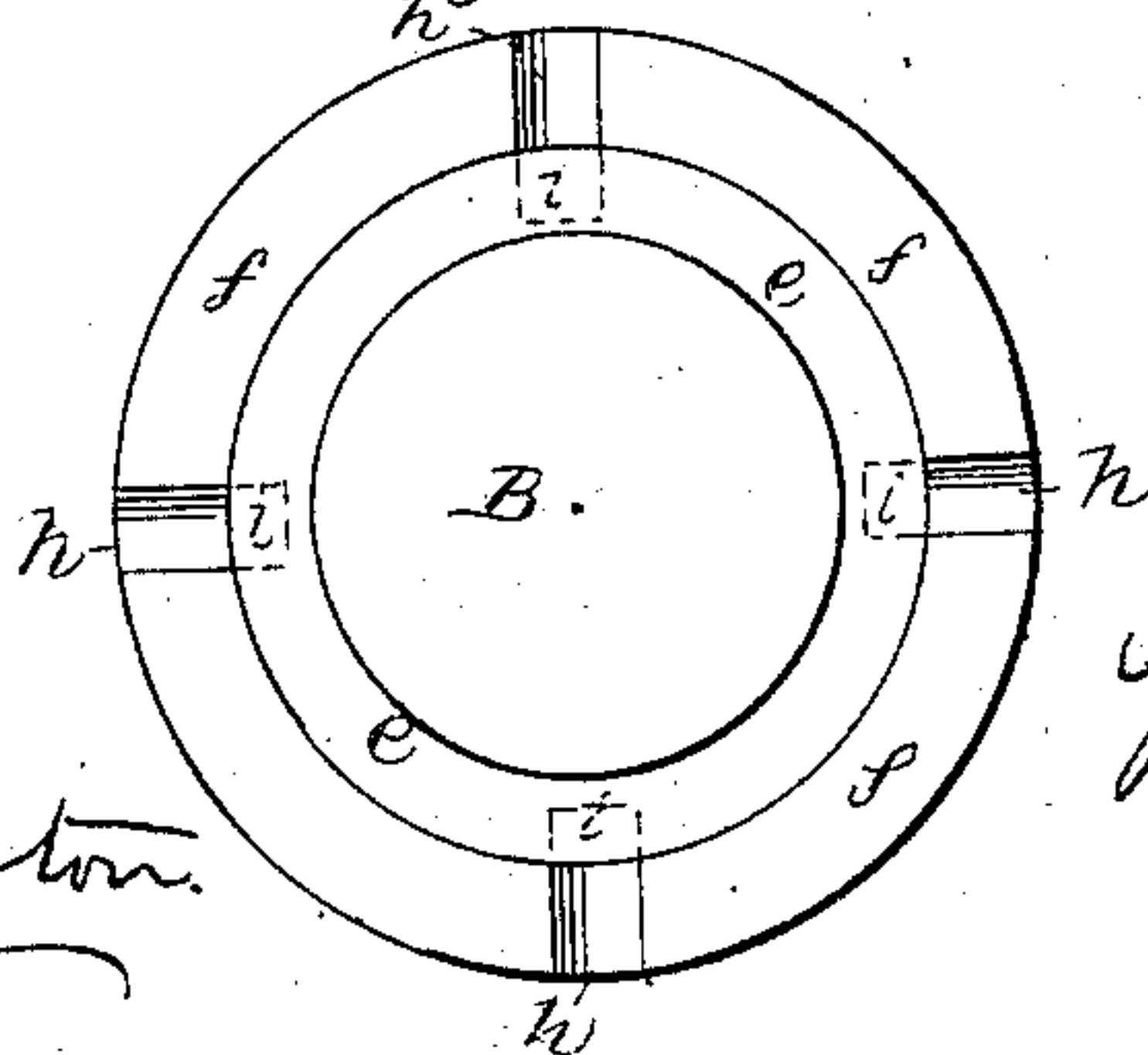


Fig. 5.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN PROJECTILES FOR RIFLED ORDNANCE.

Specification forming part of Letters Patent No. 34,031, dated December 24, 1861.

*To all whom it may concern:*

Be it known that I, CHARLES H. SAYRE, of the city of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Elongated Projectiles for Rifled and other Ordnance; 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 projectile with my improvements. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a central longitudinal section of the head of the projectile separate from the base-piece or expansion-plug. Fig. 4 is a central longitudinal section of the base-piece separate from the head. Fig. 5 is a front view of the expansion-plug.

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

This invention consists, first, in the employment, in combination with a leaden or other soft-metal band applied to the exterior of a projectile, of an expanding tube, of wrought or malleable iron, copper, or other suitable tough or tenacious metal, lining the said band, and serving to attach it permanently to the head or body of the projectile and prevent its being loosened or flying off therefrom.

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

A is the head of the projectile, having in the center of its rear a shallow cylindrical cavity, *a a*, in which is secured, by being cast or screwed in, the wrought or malleable iron or other hard-metal tube *b*, which constitutes the first-mentioned feature of my invention. This tube is slit longitudinally from the rear end nearly to where it is received in the head A, as shown at *c c* in Fig. 3, to allow it to expand radially, and it is perforated in several places, as shown at *d d* in Figs. 2 and 3, to allow the soft metal of which the outer band, C, is composed to run into it in the casting of the said band.

B is the cast-iron plug, which constitutes the base-piece of the projectile, having its front

part fitting easily to the interior of the tube *b*, having a conical enlargement, *e*, in rear of the part which fits the said tube and terminating in rear of all with a flange, *f*, the outer circumference of which is equal to that of the largest part of the head A—that is to say, of a size to pass easily into the bore of the gun. The front face of the flange *f* and the rear face, *g*, of the head A are chamfered in an inward direction for the reception of the ends of the band C. The flange *f* has recesses *h h* (see Figs. 1, 4, and 5) in its rear face, and from these recesses holes *i i* extend into the body of the plug, for the reception of a portion of the metal of which the ring C is composed, as will be presently more fully described. The plug B is of such length that when inserted as far into the tube *b* as the cone *e* permits, there is a chamber, *j*, left between the front end of the plug and the front end of the cavity *a* in the head A, such chamber being the grease-chamber. From this chamber *j* there are holes *k k*, leading through the sides of the head for the issue of the grease. The grease (generally tallow) is inserted in the chamber *j* before the insertion of the plug B into the tube *b*, which, as has been hereinbefore stated, is permanently attached to the head A by being cast or screwed into it. The plug B is then inserted into the tube *b* as far as permitted and the head and plug placed in a suitable mold, in which the ring C is cast. The lead or other soft metal of which this ring is composed runs, while in a fluid state, into the holes *d d* in the tube *b*, and so secures the ring to the head, and also runs into the recesses *h h* and holes *i i* of the head, and so forms hooks *l l*, hooking into the plug, and by these means the head, the plug, and the ring are secured firmly together. On the firing of the charge of the gun in which the projectile is placed, the force of the explosion, acting against the whole rear of the plug, drives it forward into the tube *b* and head A, and so causes grease for lubrication of the bore and grooves of the gun to be forced out from the chamber *j* through the holes *k k*, and at the same time causes the cone *e* of the plug B to expand the tube *b* and band C to such a degree as to cause the said band to be driven out tightly against the walls of the gun and portions of it to be driven into



the rifle-grooves when the projectile is used in a rifled gun. The rotary motion which the band derives in its passage along the rifle-grooves is imparted to the projectile by reason of the entrance of the band into the holes *d*, recesses *h*, and holes *i*. In the flight of the projectile, even though the plug B or any other base-piece that might be employed should leave the head A, the band will remain attached, as it not only fits very tightly upon the tube *b*, through whose expansion its own expansion is produced, but it is secured by portions of its metal entering the holes *d d*.

The same effects as are produced by the driving forward of the plug by the force of the explosion may be in some manner produced

by the driving back of the head A upon the plug by the act of ramming the projectile home against the charge.

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

The employment, in combination with a leaden or other soft-metal band applied to a cast-iron projectile, of a lining-tube, *b*, of wrought or malleable iron or other suitable tough or tenacious metal, attaching the said band to the head of body of the projectile, in the manner substantially as herein specified.

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Witnesses:

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