

(No Model.)

2 Sheets—Sheet 1.

J. VAVASSEUR.

PROJECTILE FOR ORDNANCE.

No. 271,382.

Patented Jan. 30, 1883.

Fig: 1.

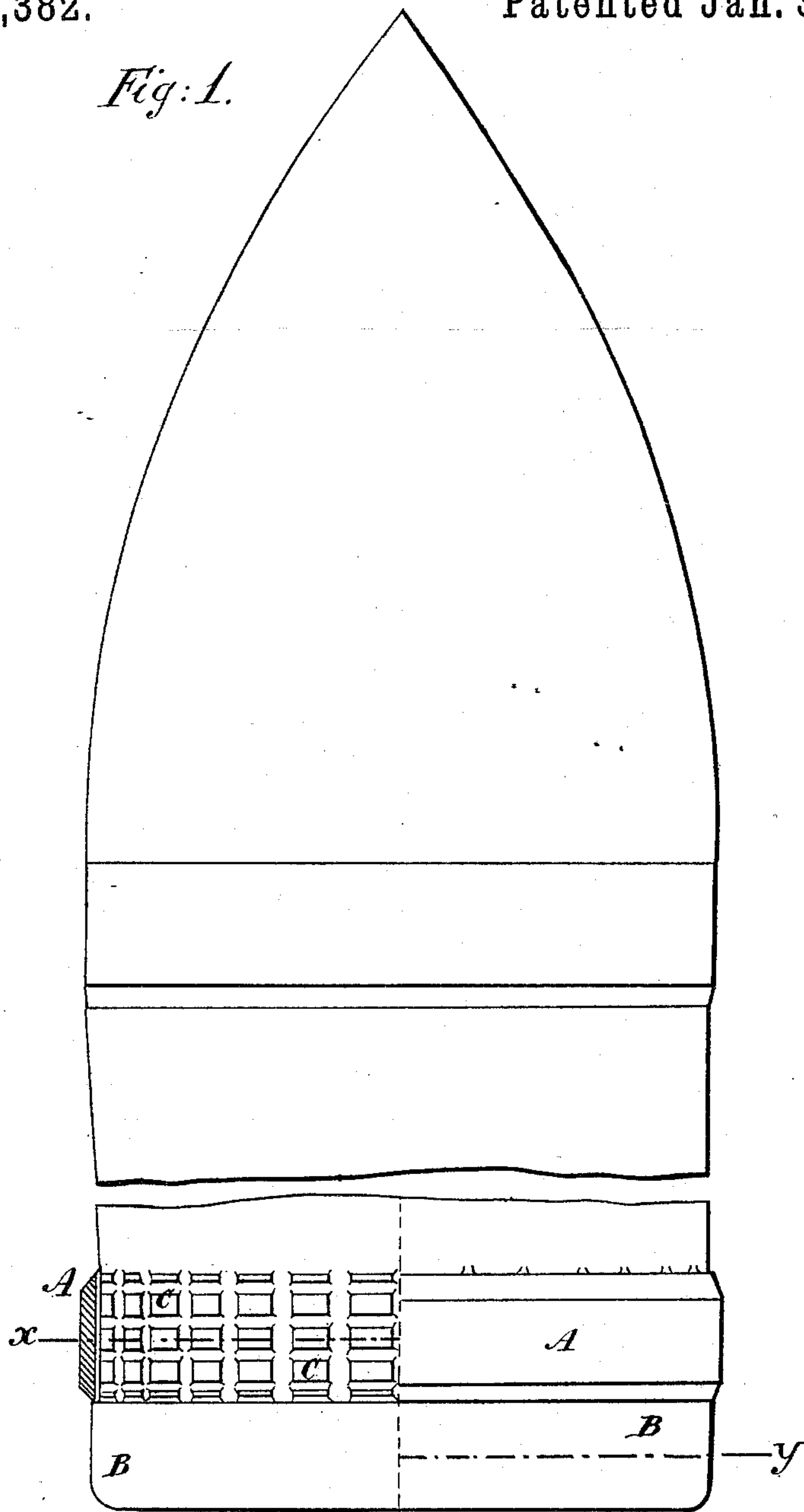
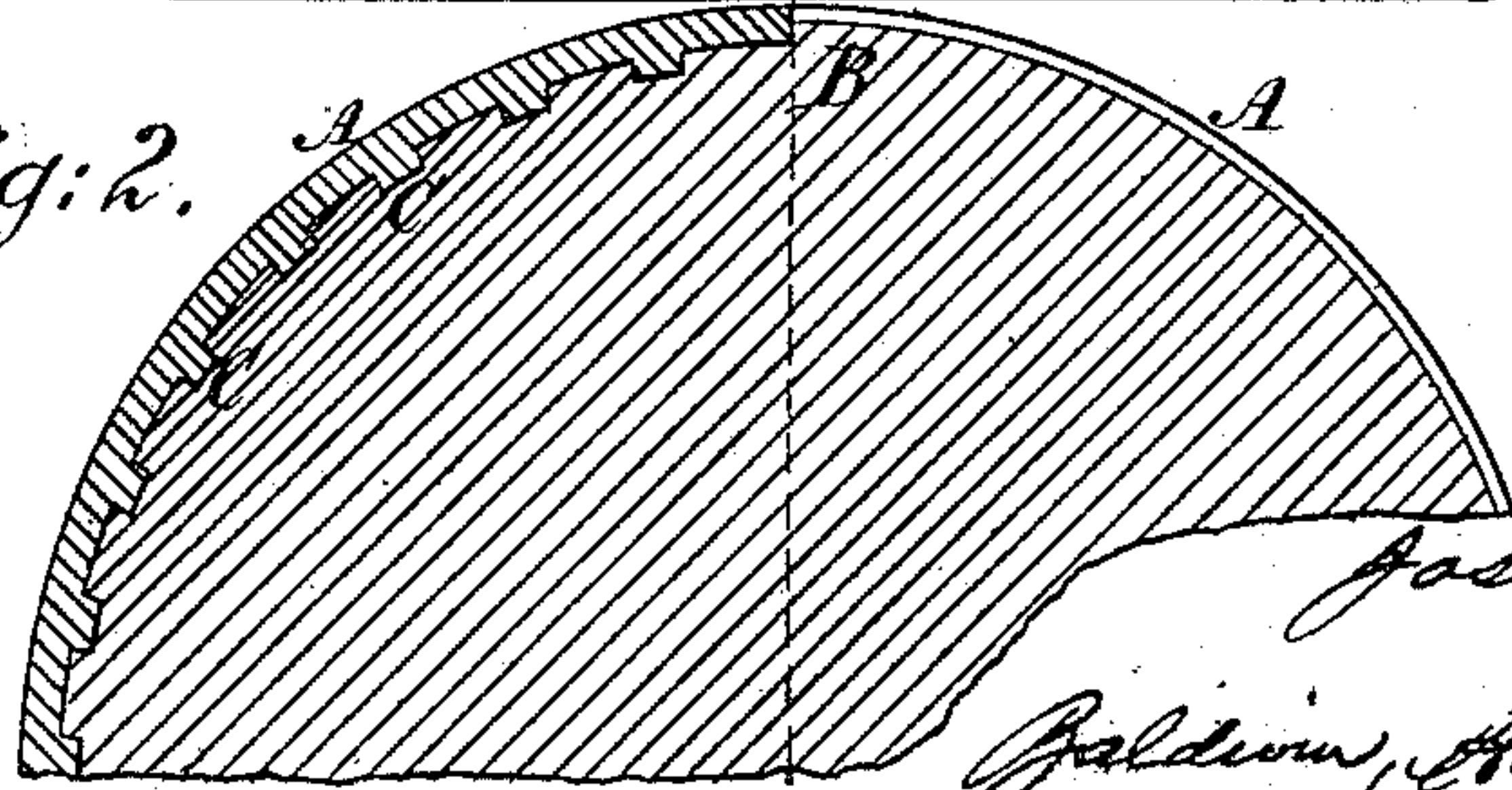


Fig: 2.



Witnesses
L. B. Wright
James Young,

Inventor.

Josiah Vavasseur,
by his atty—
Baldwin, Hopkins & Payton.

(No Model.)

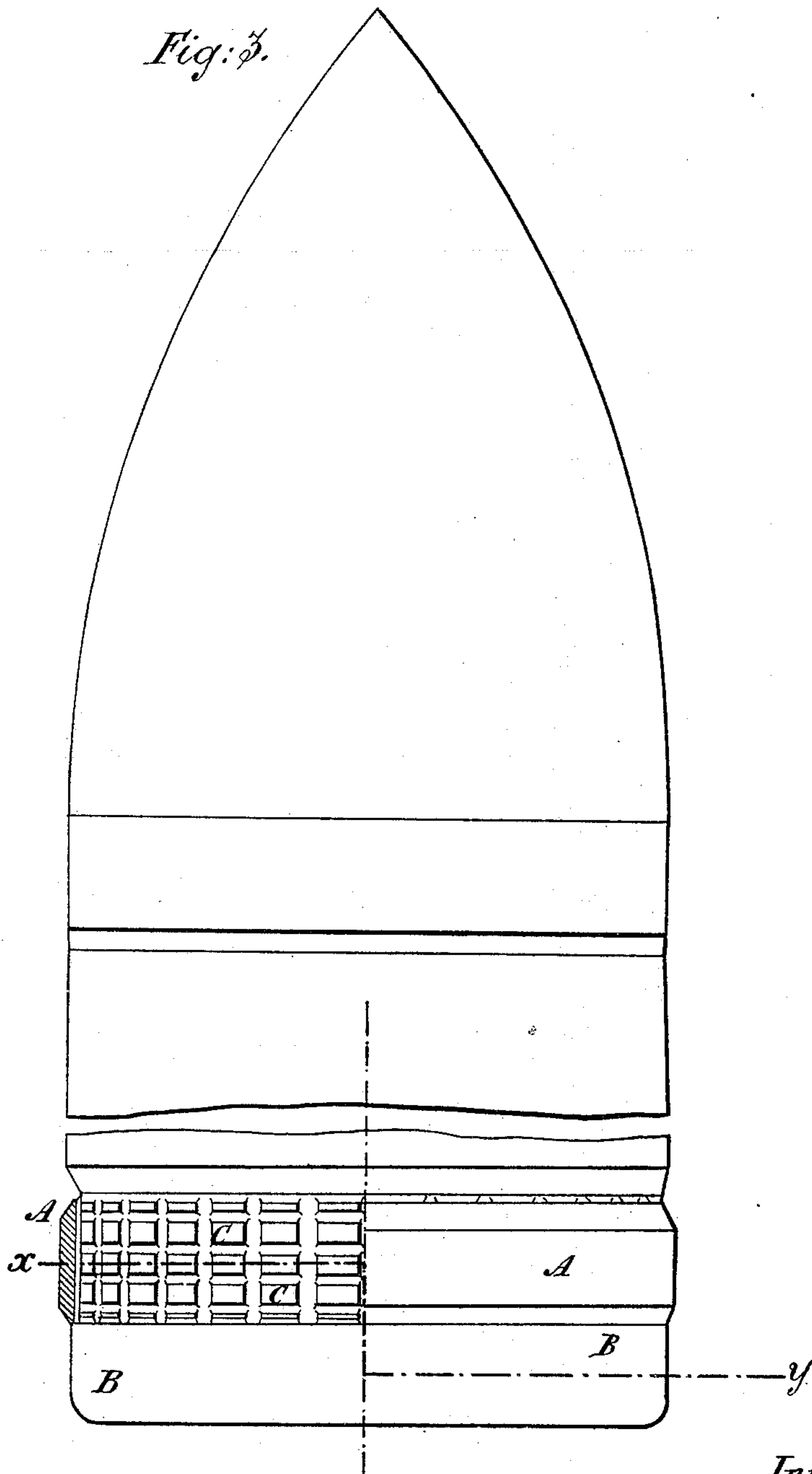
2 Sheets—Sheet 2.

J. VAVASSEUR.
PROJECTILE FOR ORDNANCE.

No. 271,382.

Patented Jan. 30, 1883.

Fig: 3.



Witnesses
L. B. Night
James Young.

Inventor
Josiah Vavasseur,
by his attys—
William Hopkins & Peyton.

UNITED STATES PATENT OFFICE.

JOSIAH VAVASSEUR, OF THE LONDON ORDNANCE WORKS, BEAR LANE,
SOUTHWARK, COUNTY OF SURREY, ENGLAND.

PROJECTILE FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 271,382, dated January 30, 1883.

Application filed May 31, 1882. (No model.) Patented in England April 1, 1882, No. 1,592; in Germany May 7, 1882, and in France May 15, 1882, No. 136,855.

To all whom it may concern:

Be it known that I, JOSIAH VAVASSEUR, a subject of the Queen of Great Britain, residing at the London Ordnance Works, Bear Lane, Southwark, in the county of Surrey, England, have invented certain new and useful Improvements in the Manufacture of Projectiles for Breech-Loading Rifled Ordnance, (for which I have obtained Letters Patent in Great Britain, No. 1,592, dated April 1, 1882; in France, No. 136,855, dated May 15, 1882, and in Germany, dated May 7, 1882,) of which the following is a specification.

This invention has for its object improvements in the manufacture of projectiles for breech-loading rifled ordnance.

In the specification of a former patent granted to me in the year 1875, No. 160,855, I described the securing of solid bands or rings of copper or other suitable metal around the circumference of projectiles by inserting the bands or rings into grooves formed to receive them. The bands or rings were reduced in diameter and made to fit into the grooves by forcing the projectiles, with the rings surrounding them, through dies. When the rings are all cut accurately to size and the grooves around the projectiles all turned accurately to form, no difficulty is experienced in securing the rings into the grooves in the above manner. In the manufacture, however, of chilled-iron projectiles and all projectiles cast to form, the grooves, if cast in, are irregular in dimensions, and no such uniformity in diameter and width of groove can be obtained as when the grooves are cut in. If the grooves are cut in, the strength of the projectile is materially reduced by the removal of the skin. If the grooves are cast in, and consequently irregular, the rings, which are all of one uniform size, will have to be put into grooves of varying widths and depths, and the distance between the bottom of the groove and the inner circumference of the die through which the projectile and the ring surrounding it have to be passed will vary with the irregularity in the depth of the groove. If the groove is too deep—that is, if the diameter of the projectile at the bottom of the groove is too small—there may not be suffi-

cient metal in the ring to fill the space between the bottom of the groove and the die, and the ring will not be made to grip the projectile with sufficient firmness; consequently the ring will be loose, and will have to be cut off and another and thicker one put on in its place. If, on the other hand, the groove is shallow—that is, if the diameter of the projectile at the bottom of the groove is too great—there is more metal in the ring than is required, and the excess, as it passes through the die after filling up the space between the bottom of the groove and the die, puts such a stress upon the base of the projectile that the projectile is frequently fractured, or, if not, the metal of the projectile is left in such a state of tension that when fired in the gun the base of the projectile comes off. With chilled-iron projectiles in which the tensile strength of the metal is very low, this is a source of great danger. To remedy these evils I now form the projectile with an abutment to come against the rear end only of the ring, and with no abutment in front of the ring, and around the circumference of that part of the projectile which is to be embraced by the ring, and which is just in front of the abutment, I form numerous grooves, notches, or indentations, either longitudinally, circumferentially, or both, or make it of a polygonal form to prevent the ring turning or moving forward on the projectile. In this way, when a copper ring is drawn down onto the projectile in front of the abutment the ring can be made to grip closely the part of the projectile prepared to receive it, and to enter the grooves, notches, or indentations formed therein, even though it be irregular in size, while any excess of metal will only make the ring of greater width without putting strain upon the projectile, tending to break off its base. Chilled projectiles, or those made of very hard metal, which have been cast to form, may consequently have bands of copper fixed around them without the projectiles being weakened by the removal of the skin of the casting, and, in addition, the projectiles can be made at less cost.

In order that my invention may be fully understood, I have shown in the drawings here-

unto annexed examples of projectiles having a copper band secured around them in the manner above described.

Figure 1 is a side elevation of the two ends of a projectile with a portion of the copper band cut away. Fig. 2 is a cross-section of the same, taken on the line *xy*, Fig. 1.

The back end of the head of the projectile, where it joins onto the cylindrical part or body of the projectile, is made of somewhat larger diameter than the remainder of the body, so that it may just fit easily within the bore of the gun. The rear end of the body of the projectile has also formed around it a projecting flange to form the abutment for the copper band.

A is the copper band. B is the abutment in rear of the band. C are grooves or notches formed in that part of the circumference of the projectile which is to be embraced by the band. The body of the projectile may be solid or hollow, as a shell, and, as before stated, it may be cast with the grooves or notches C formed in it.

To fix the copper band around the projectile, I preferably proceed as follows: The ring or band is at first of a diameter large enough for it to be slipped over either end of the projectile. The diameter of the ring on that side of it which is toward the abutment on the projectile is then made of less diameter than the abutment by forcing it for a certain distance into a properly-prepared conical die. The opposite side of the ring is now inserted into the tapered mouth of a suitable die, and the projectile and ring are together forced through this die, which may either be of a diameter to at once reduce the band to the required size

and to make it grip the projectile with sufficient firmness, or it may be passed through two or more dies in succession to reduce it gradually to the size required. In this way not only is the band reduced to the required size, but the metal on the inner surface of the band is squeezed into the grooves or notches C on the projectile, whereby the band is held securely in its proper place. When the band has thus been fixed around the projectile it is turned, in a lathe or other suitable machine, to the required profile and again passed through a suitable die to insure absolute uniformity in the external diameter of the ring.

It is not necessary that the whole of the body of the projectile between the band and the head should be reduced in diameter to the extent shown at Fig. 1. It is sufficient if a short length only of the body is thus reduced just in front of the band, as shown at Fig. 3. Preferably, however, I form the projectiles in the way shown at Fig. 1.

Having thus described the nature of my invention and the manner of performing the same, I would have it understood that I claim—

The hereinbefore-described projectile, reduced in diameter for a portion of its length, provided with the abutment or annular flange terminating such reduced portion at rear, and having the band, of a width less than the length of its reduced portion, secured about it in advance of and against the abutment, substantially as and for the purpose set forth.

JOSIAH VAVASSEUR.

Witnesses:

JOHN DEAN,

T. J. OSMAN,

Both of 17 Gracechurch Street, London.