

FIG. 1.

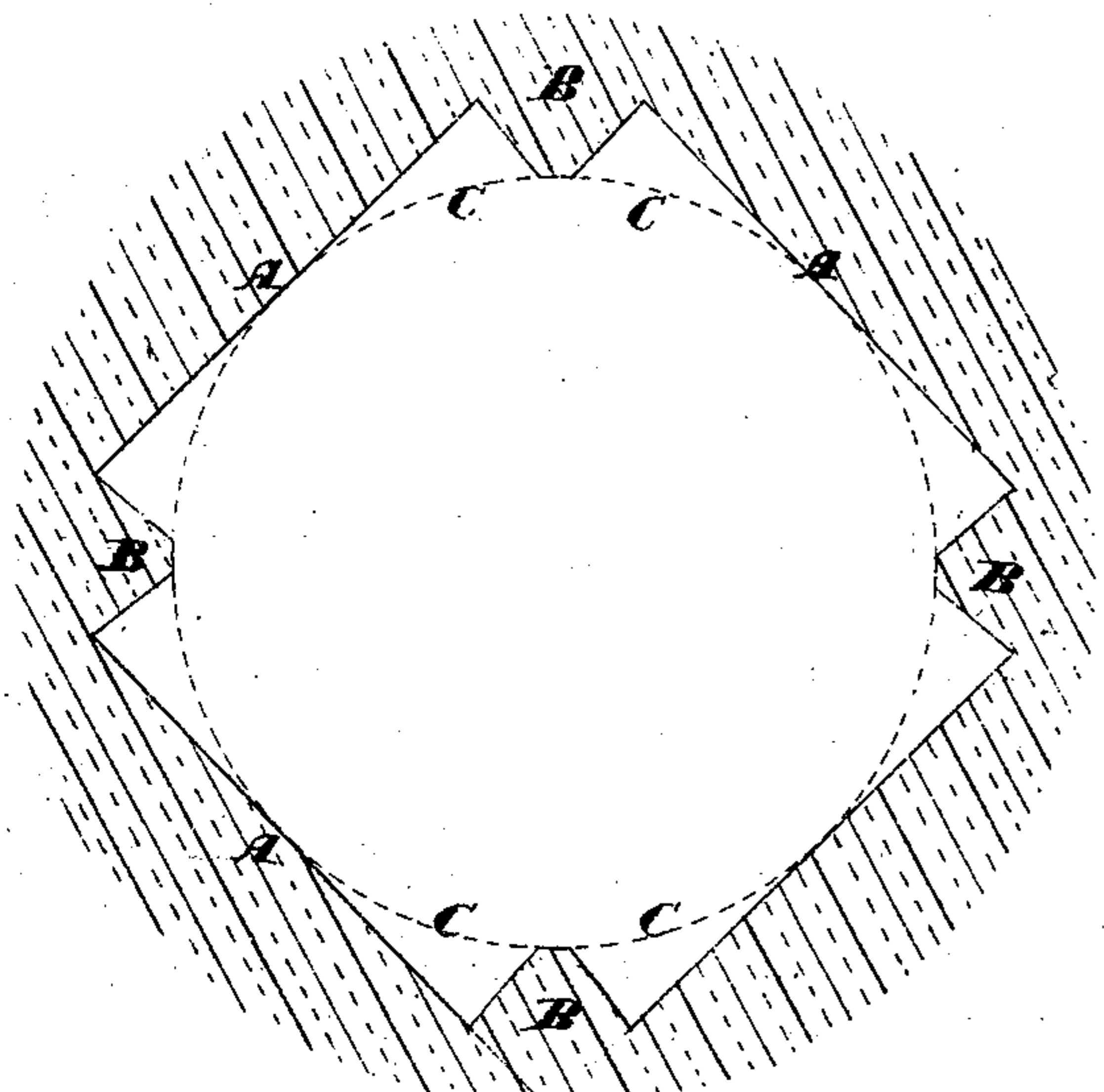


FIG. 2.

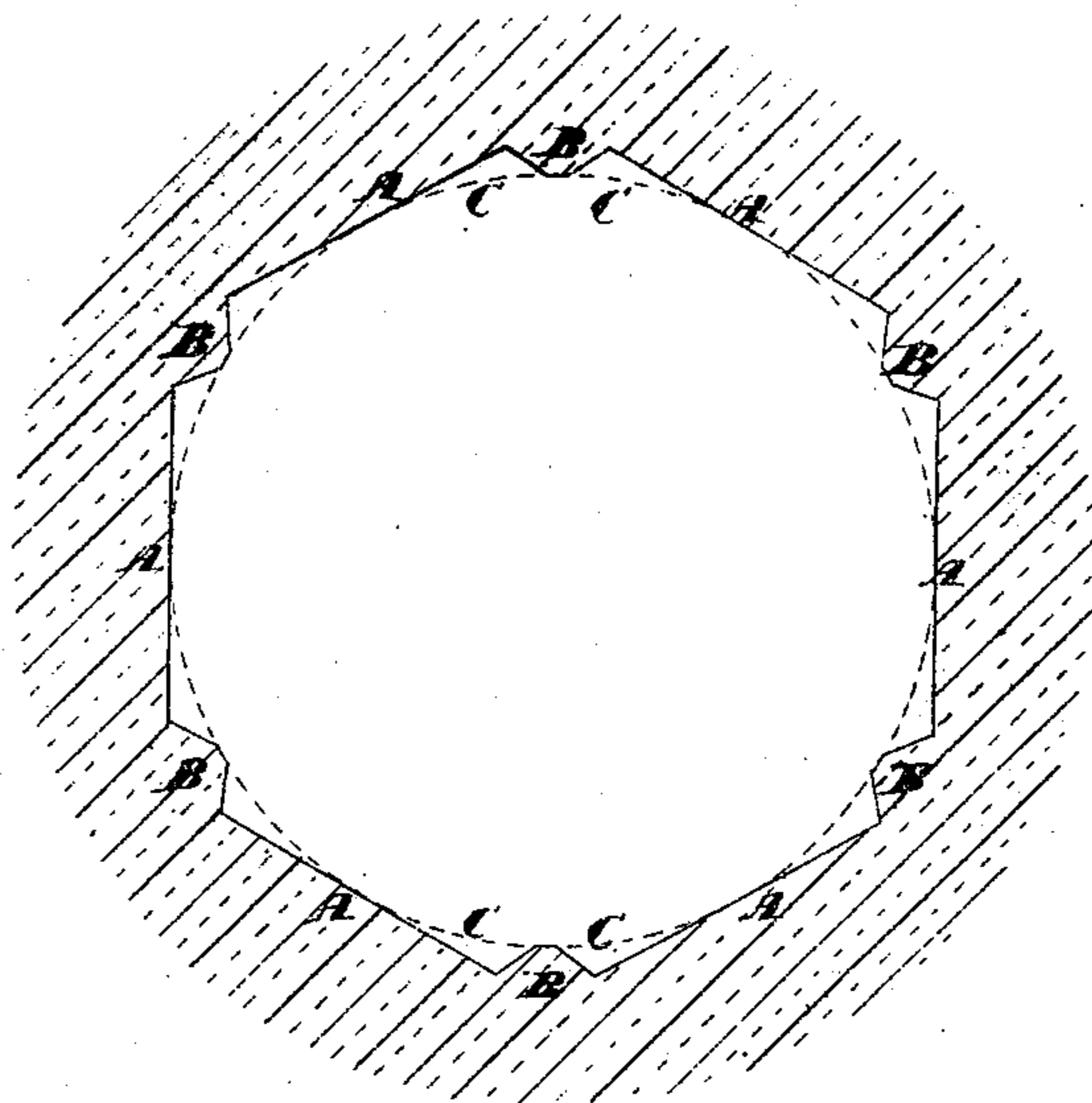


FIG. 3.

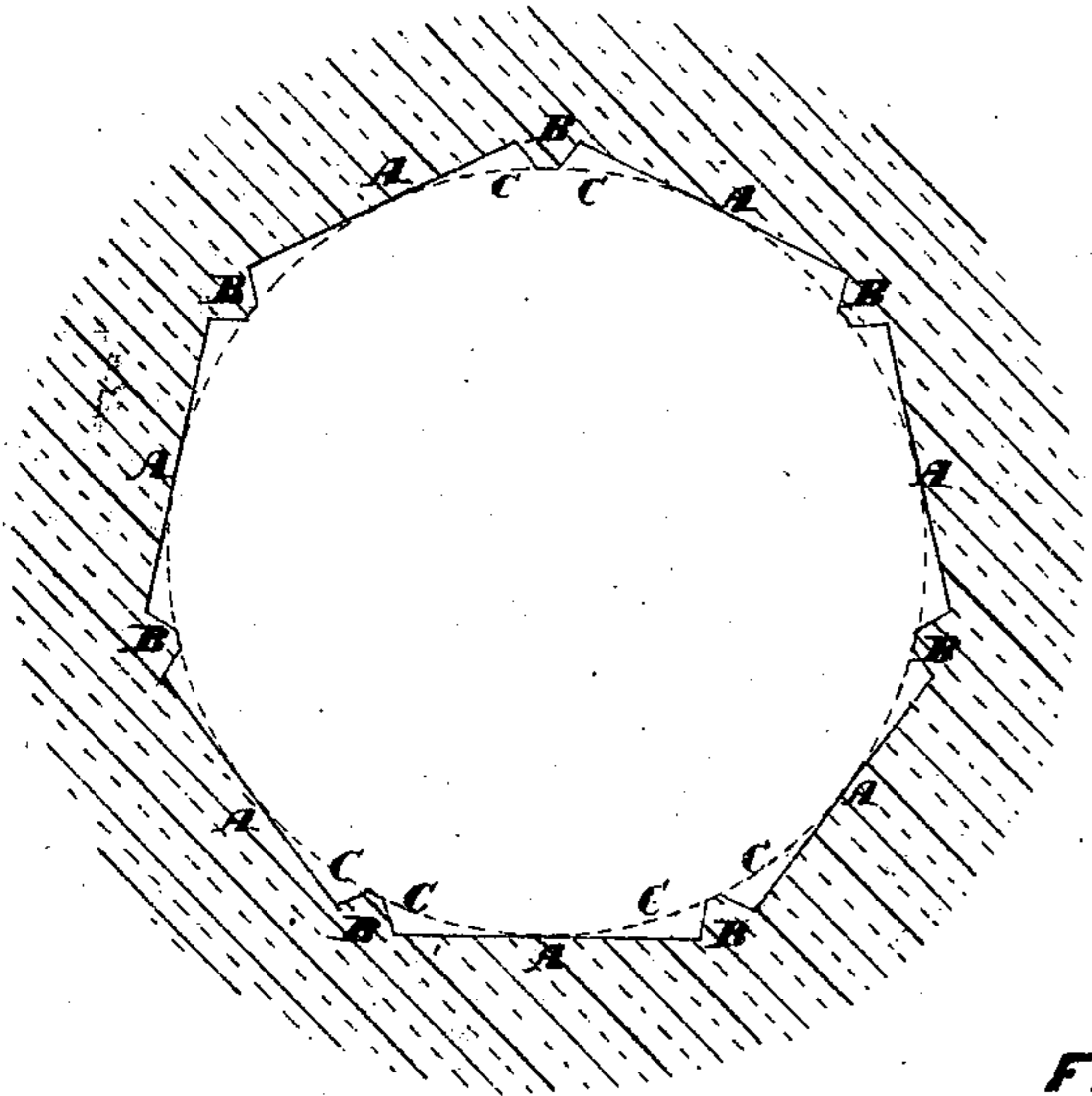


FIG. 4.

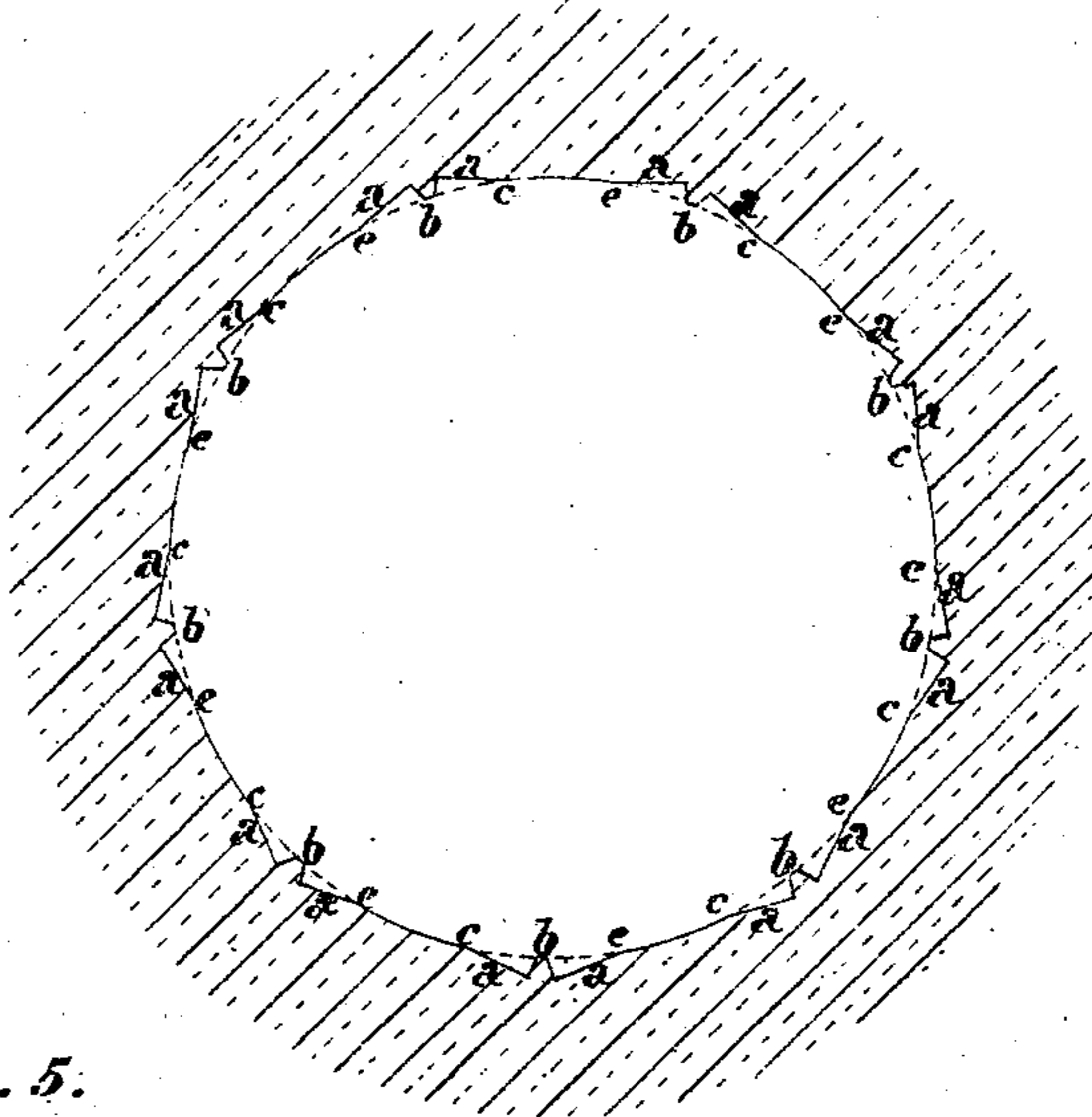
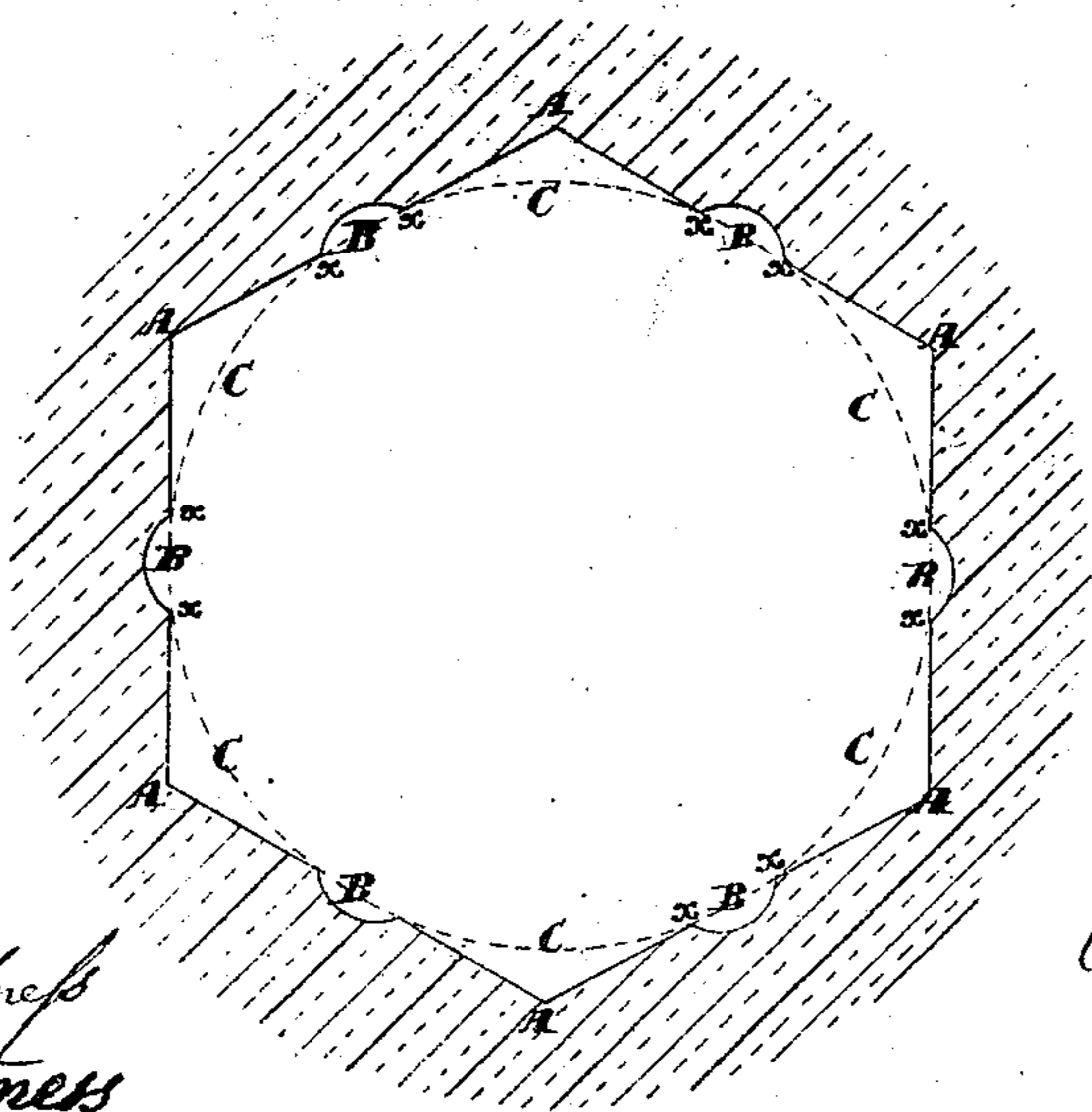


FIG. 5.



George Smith, Witness
George Traser, Witness

Alex Henry

ALEX. HENRY.

Improvement in Rifled Fire-arms.

2. Sheets

Sheet 2.

No. 119,846.

Patented Oct. 10, 1871.

FIG. 1.

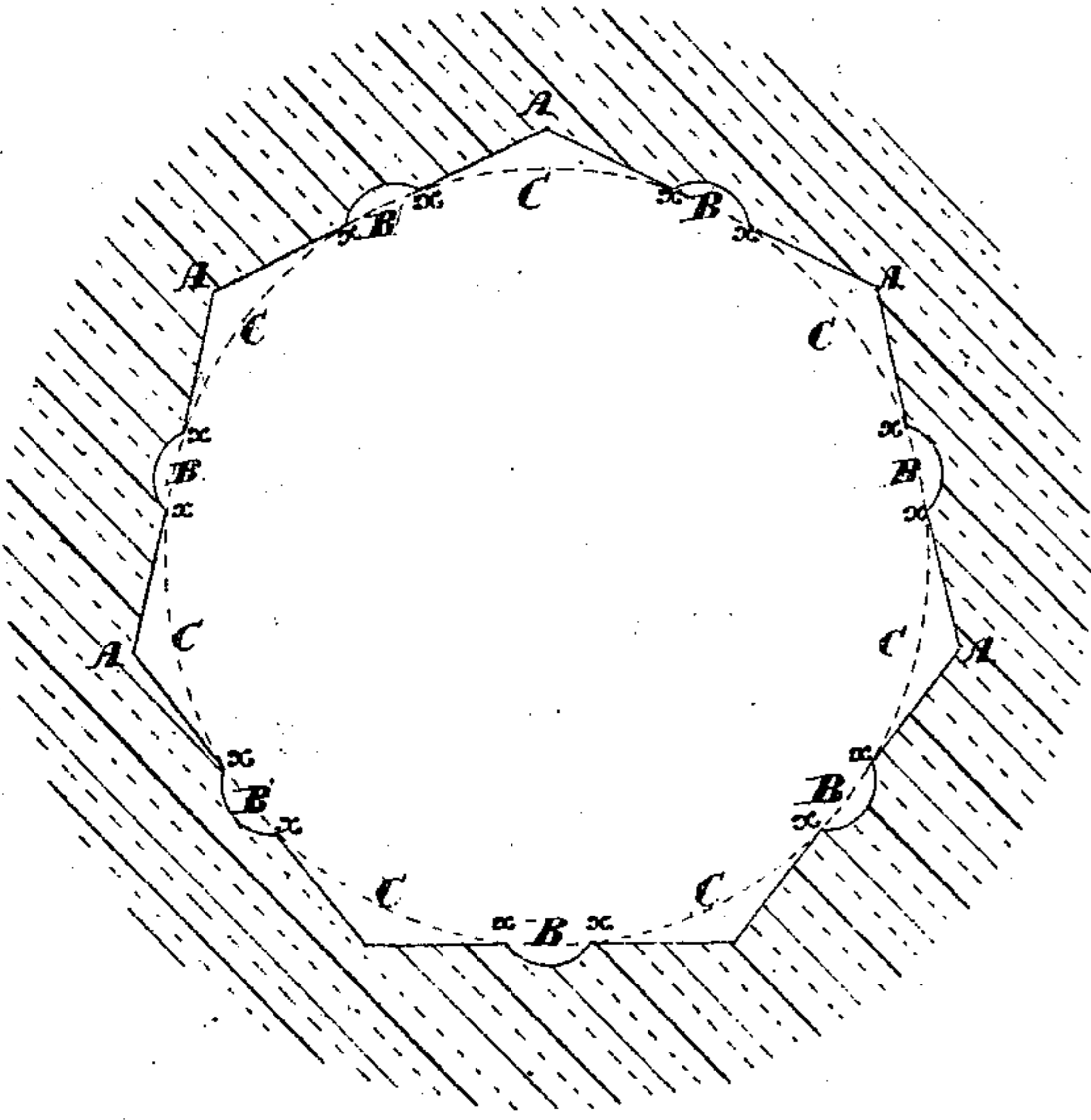


FIG. 2.

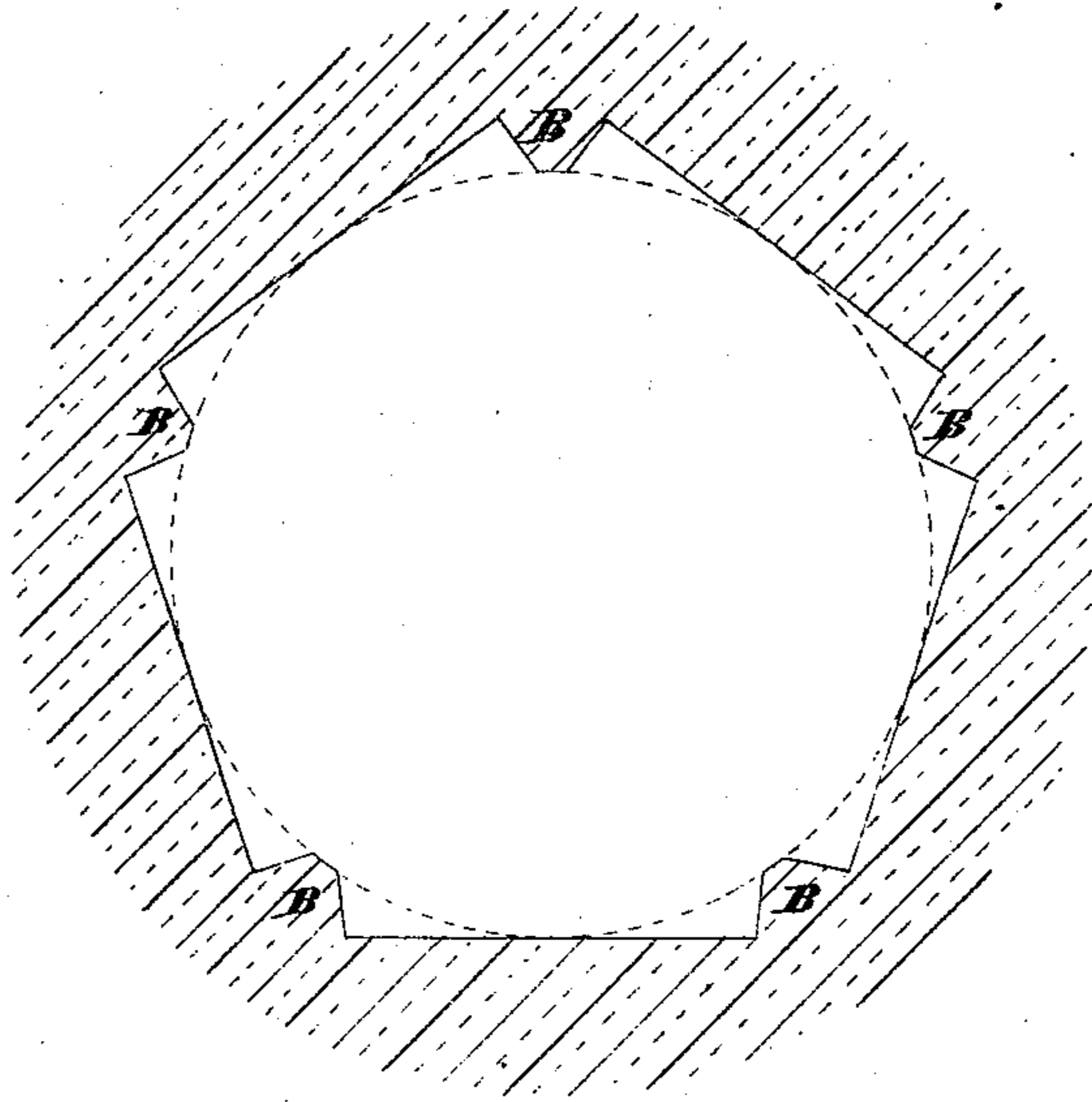


FIG. 3.

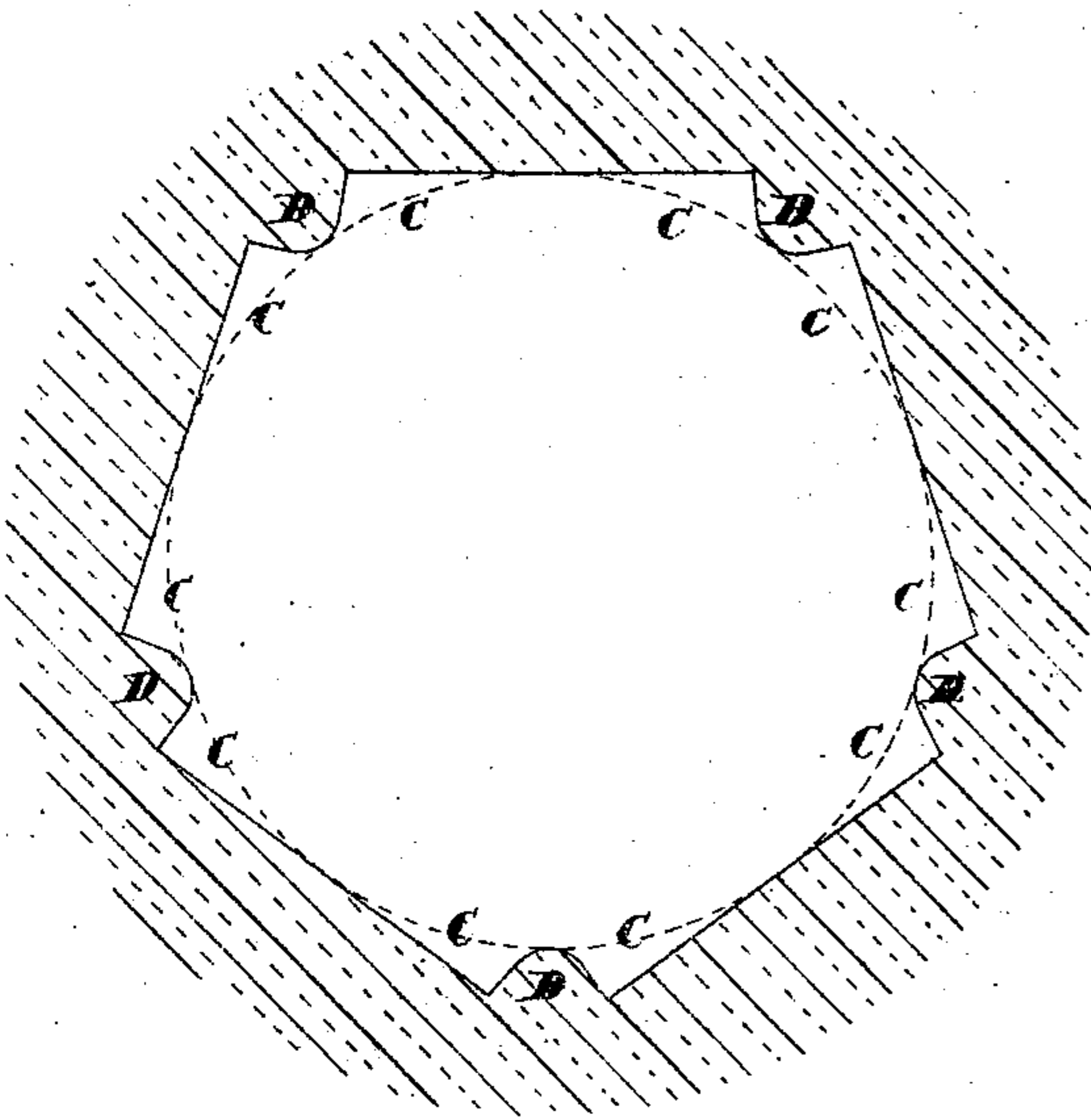
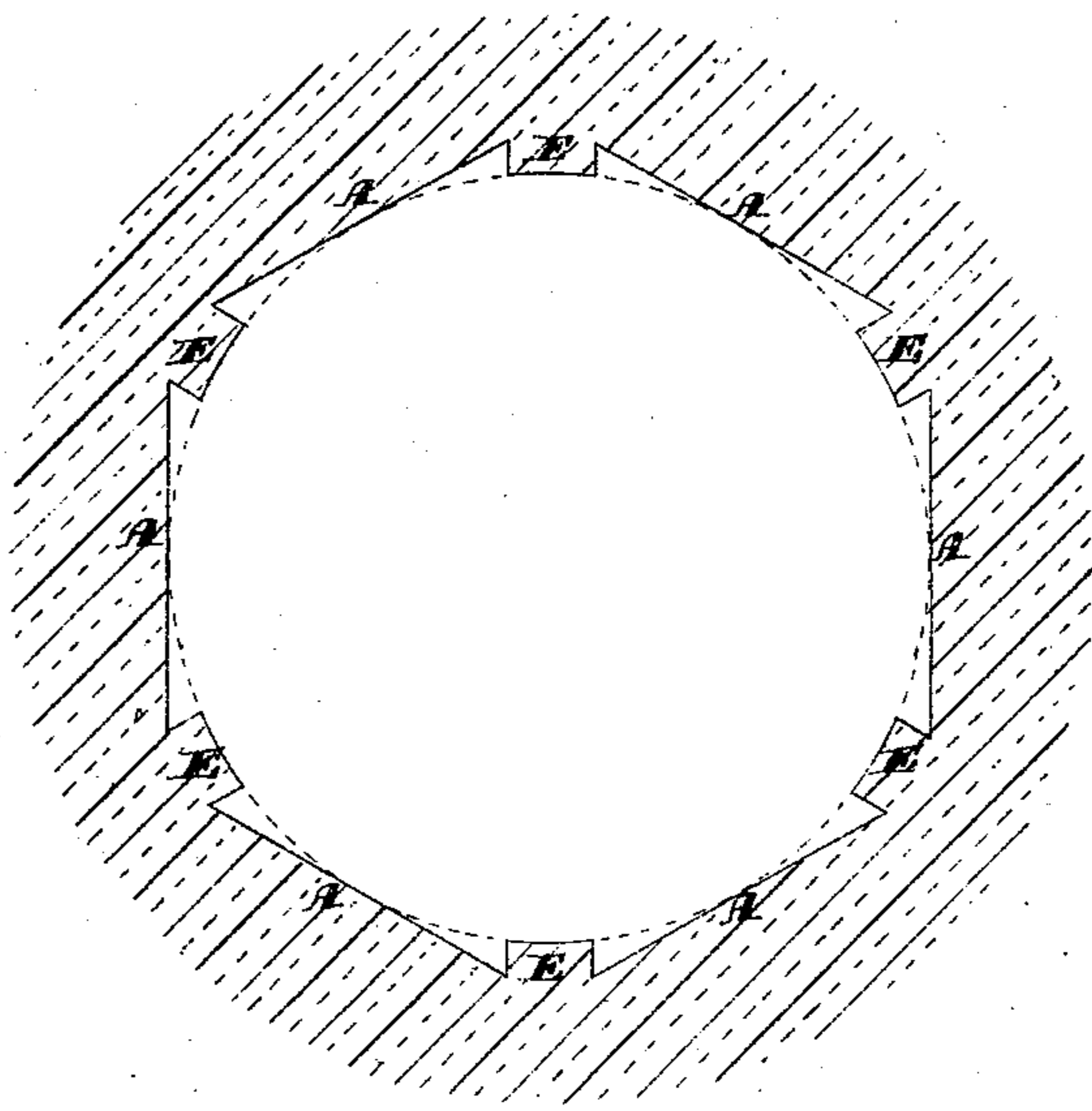


FIG. 4.



George Smith Witness
George Fraser Witness

Alex Henry

UNITED STATES PATENT OFFICE.

ALEXANDER HENRY, OF EDINBURGH, NORTH BRITAIN.

IMPROVEMENT IN RIFLED FIRE-ARMS.

Specification forming part of Letters Patent No. 119,846, dated October 10, 1871.

To all whom it may concern:

Be it known that I, ALEXANDER HENRY, of Edinburgh, in the county of Mid Lothian, North Britain, have invented Improvements in Rifled Fire-Arms, of which the following is a specification:

This invention relates to the arrangement and construction of rifled fire-arms, the essential peculiarity consisting in the form of the rifled bore, which includes a series of planes, angles, and grooves. These surfaces may be formed or arranged in various ways; and instead of relying wholly upon acute angles, semi-circular or curvilinear projections or indentations may be produced upon the interior of the bore. In one example of the improved bore, consisting of such a combination of planes and narrow curvilinear or angular surfaces or portions, the surface of the bore, as made up of wide planes and narrow grooves, admits of a plug or missile of larger size than usual, and of course requiring less expansion to fill the planes than one which touches the centers of the planes only. And while it requires less expansion there is less windage, and the planes with the grooves have more power to insure the proper rotation of the missile or ball. In other forms of bore embraced by this invention planes and internal projections, either round or square or acute, are combined so as to afford double the number of points of bearing for the missile when in the barrel, less windage before starting it, and requiring a less amount of expansion to fill up the planes, while there is an equal amount or more power to cause the missile to rotate.

Figures 1 to 5, Sheet 1, of the accompanying drawing are transverse sections of portions of the barrels of fire-arms, showing several modifications of my improved modes of rifling fire-arms. In the modification shown in Fig. 1 the barrel is rifled so that in its end view or transverse section it presents a quadrilateral figure, with angular projections or "lands" extending inward from the angles of the planes. In other words, the rifling of the barrel forms four plane surfaces A, and the periphery of the projectile C, which is indicated by a dotted circle, touches the planes A at the centers. In addition to the bearing surfaces thus obtained there are angular projections B which extend inward from the planes A, so that the apex of each of the projections B is con-

centric with the center of the surfaces of its contiguous planes A. These four ridges B thus afford a further bearing or support to the projectile, and by this means double the number of points of bearing is obtained. These angular ridges also fill up to a great extent the spaces between the angles of the planes A and the periphery of the projectile, thus reducing the windage by lessening the amount of expansion necessary to cause the projectile to fit the grooves of the rifle or other fire-arm, so that the rotatory or spiral motion of the projectile is obtained with greater certainty, and consequently its flight is rendered more accurate. In the modification shown in Fig. 2, Sheet 1, of the accompanying drawing the number of plane surfaces A is increased to six, affording a corresponding number of bearing points to the projectile delineated by the circle C. But there are also the bearing points obtained by the angular ridges B intervening between the planes A, which fill up to a greater extent the space between the barrel and the projectile. In this way a very small amount only of expansion is required to cause the projectile to fill up the grooves of the rifling. The number of the planes A, in combination with the angular ridges B, may be increased to twelve planes, or, indeed, to a greater number, according to the capacity or diameter of the bore of the barrel, the system of rifling being equally applicable to ordnance as to small arms. Fig. 3, Sheet 1, is also a representation showing the rifling as composed of a seven-sided figure with angular ridges B intervening. In this mode of rifling the projectile delineated by the circle fills up the bore of the barrel to a still greater extent than in the arrangement of rifling shown at Fig. 2. Fig. 4, Sheet 1, of the drawing represents in transverse section another modification of my improved rifled grooves. In this case the grooves *a a* are formed by cutting flat planes at either side of segments of the original circular bore of the barrel, portions of the original bore extending from *c* to *c* being left between each plane. In forming the grooves ridges *b* are left projecting out between any two rifled grooves, and the apex of each ridge *b* forming part of the original bore, constitutes a further bearing point for the periphery of the projectile. Under this modification the projectile nearly fills up the whole bore of the barrel, and thus reduces the windage by

lessening the amount of expansion necessary to cause the projectile to fit the grooves of the rifle or other fire-arm. In the example illustrated at Fig. 5, Sheet 1, the system of rifling combines a series of planes with curvilinear grooves. The planes A form a hexagon, but in the center of each plane a curved groove, B, is formed; the ridges or boundary lines x of these several grooves thus form the bearing points for the projectile C. This system of combined curvilinear grooves with planes is further exemplified at Fig. 1, Sheet 2, of the drawing, in which the rifling consists of seven plane surfaces A intersected or divided longitudinally by the curved grooves B, which affords an increased number of bearing points x to the projectile C. Fig. 2, Sheet 2, represents a system of rifling composed of a five-sided figure, with angular lands or projecting ridges B similar to those hereinbefore described. Fig. 3, Sheet 2, shows a system of rifling with curved ridges or lands D whose peripheries project inward, and thus afford bearing points for the projectile C. Another arrangement of land is illustrated at Fig. 4, Sheet 2, and which forms a rectangular ridge, E, extending longitudinally between the plane surfaces A, the surface of the ridge affording a very effective bearing point for the projectile, as is shown in the figure referred to. These rectangular as well as curved ridges or lands are equally applicable to the several systems of rifling hereinbefore described and shown on the accompanying drawing, as well as to figures of a greater or lesser number of sides than are therein represented. The system of rifling delineated at

Fig. 5, Sheet 1, and at Fig. 1, Sheet 2, of the accompanying drawing is particularly adapted for long range shooting, as the grooves admit of a somewhat larger projectile being used than if the plane surfaces were not cut away, so that the amount of expansion necessary to make the projectile fill the groove is lessened; at the same time its figure is so little altered that it traverses through the air with less resistance. With fire-arms rifled according to these modes a larger charge of powder may be used, as there is less liability of stripping the bullet, thereby giving a lower trajectory and insuring greater accuracy in its flight.

I claim—

The system or mode of rifling or grooving fire-arms in which a series of planes or flat surfaces are combined with angular curved or rectangular ridges or lands, either intervening between the planes or intersecting the same, as hereinbefore described and shown in the accompanying drawing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALEX. HENRY.

Witnesses:

GEORGE SMITH,

No. 94 Constitution street, Leith, Scotland, writer, N. P.

GEORGE FRASER.

No. 94 Constitution street, Leith, Scotland, clerk. (55)