

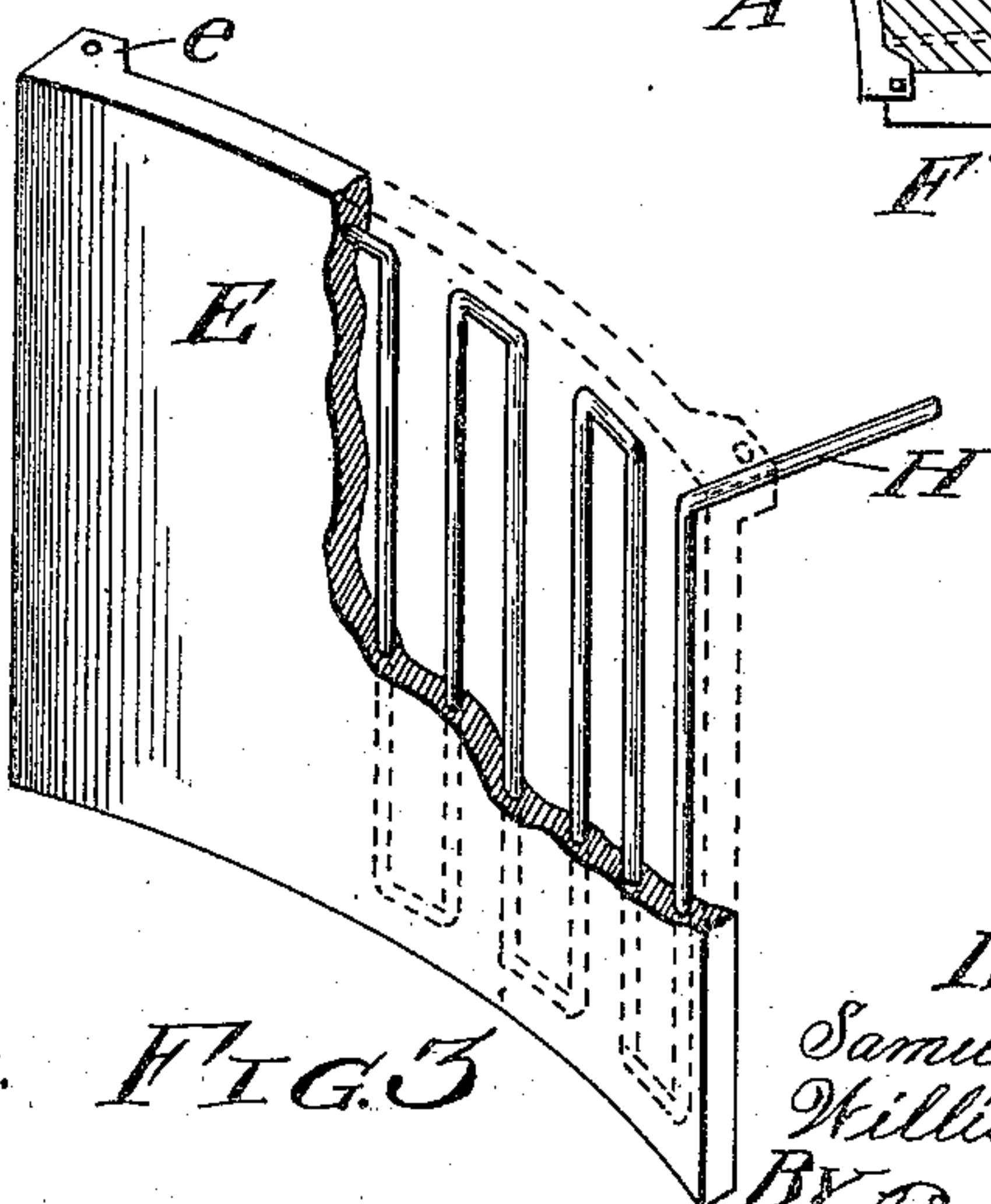
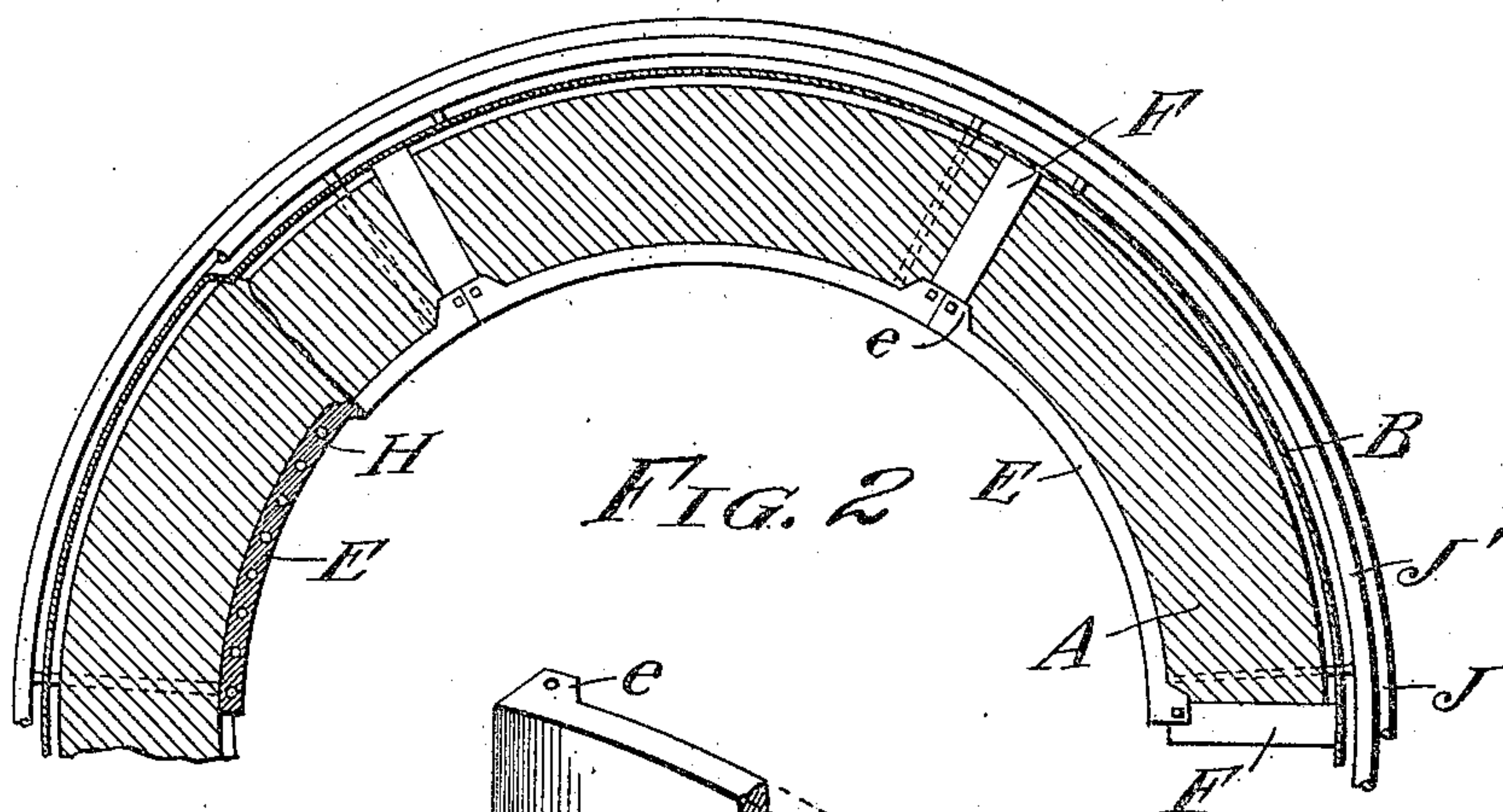
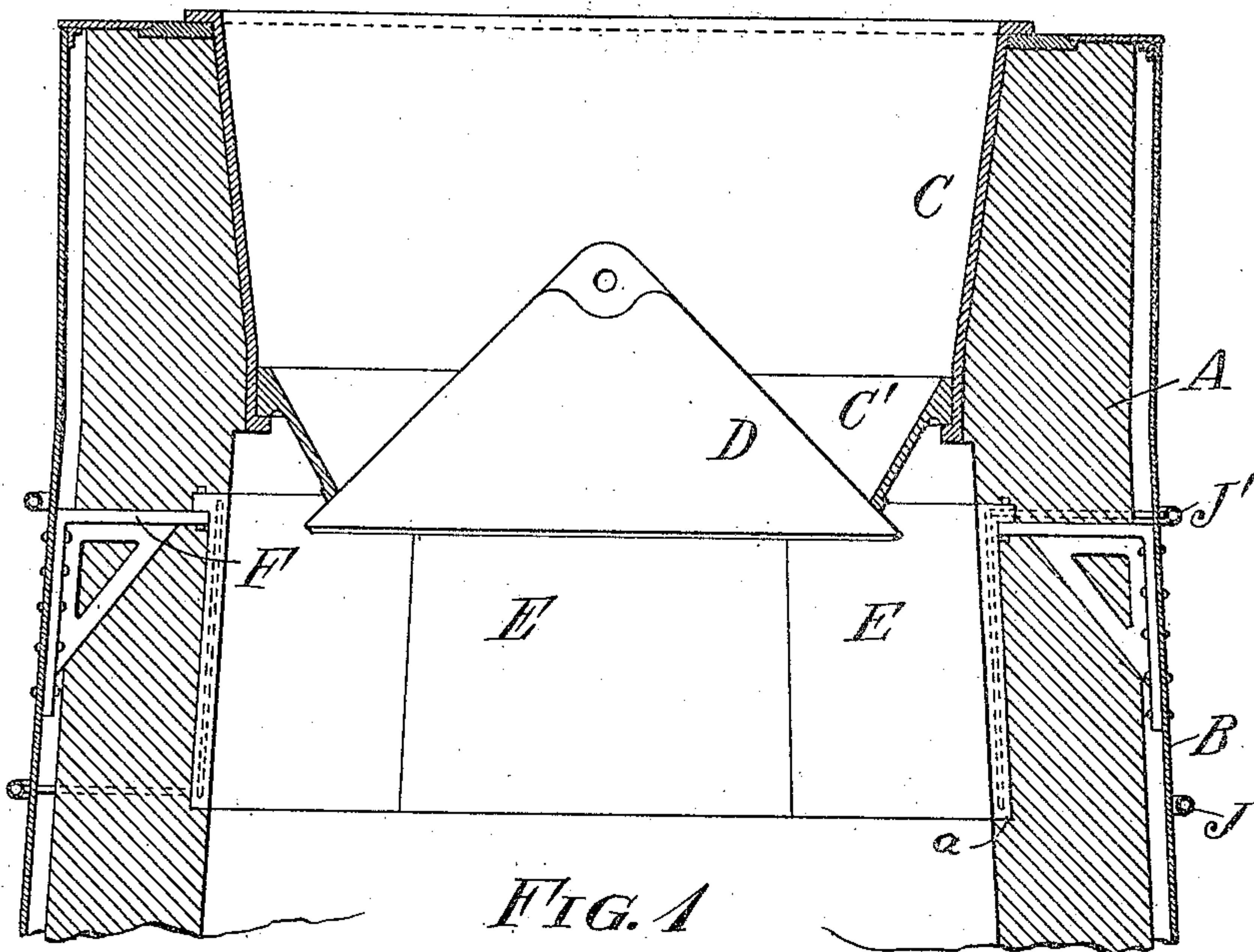
S. K. HINE & W. R. PHIBBS.

BLAST FURNACE.

APPLICATION FILED JUNE 24, 1908.

915,601.

Patented Mar. 16, 1909.



WITNESSES:

Freeman B. West.

Arthur S. Remberg.

FIG. 3

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UNITED STATES PATENT OFFICE.

SAMUEL K. HINE AND WILLIAM R. PHIBBS, OF GIRARD, OHIO.

BLAST-FURNACE.

No. 915,601.

Specification of Letters Patent.

Patented March 16, 1909.

Application filed June 24, 1908. Serial No. 440,111.

To all whom it may concern:

Be it known that we, SAMUEL K. HINE and WILLIAM R. PHIBBS, residing at Girard, in the county of Trumbull and State of Ohio, have invented a certain new and useful Improvement in Blast-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

In charging blast furnaces there has been considerable difficulty in properly distributing the charge in the furnace, due to the fact that when the bell is lowered, the material sliding outwardly gradually cuts away the wall of the furnace and thus makes a ragged ledge on which material lodges.

The object of the present invention is to provide simple and effective means to prevent this interference with the distribution. To this end we have provided a metal shield around the interior of the furnace at, and extending below, the stock line and adapted to receive the impact of the outwardly sliding load when the bell is lowered. This shield is made in segmental sections and is set into the furnace wall so that its inner surface is flush with the inner surface of the wall. We provide means to securely hold the shield in place. In order that the shield may not burn out we may arrange cooling pipes within it.

Our invention comprises the shield above described, with or without the cooling pipes.

It also includes the more particular embodiment shown in the drawing and herein-after more fully described.

In the drawing, Figure 1 is a vertical central section through the upper portion of a blast furnace; Fig. 2 is a partial horizontal section through the same; Fig. 3 is a perspective view of one segment of the shield partially broken away.

Referring to the parts by reference letters, A represents the brick work of the furnace wall and B the surrounding jacket. C is the upper portion of the hopper and C' the hopper proper. D represents the bell. These parts may be of any suitable construction, it being understood that to charge the furnace the bell is lowered to allow the load resting on it and on the hopper C' to slide downwardly and outwardly on the bell surface.

In the interior of the furnace in position to receive the charge when the bell is lowered is located our shield, comprising a series of segments E. These segments abut each

other at their edges to make a complete sleeve within the furnace. The wall is recessed, as indicated by *a*, sufficiently to receive the segments, so that their inner surface is flush with the inner surface of the wall. The segments may be provided near their upper edges at their outer sides with lugs *e*, which are bolted to brackets F set into the brick work. The outer face of these brackets may be riveted to the jacket B, as illustrated. With this construction, it will be seen that the shield is very securely held in place. At the same time, its interior provides a smooth surface on which the charge impinges, wherefore the charge drops down into the furnace evenly entirely around the bell. The effect is to give a more exact and satisfactory operation to the furnace, as well as to increase the life thereof, doing away with the repair required where the charge constantly breaks away the brick wall.

In order to prevent the heat of the furnace from gradually burning out our shield, we may, if desired, water cool the same. This we accomplish by embedding in each segment, which is preferably a steel casting, a coil or convolution of water pipe. Such pipe, which is shown herein designated H, is preferably continuous throughout each segment, passing back and forth in substantially parallel reaches, as shown. It is to be understood that the water enters at one edge of the segment and, after circulating through it passes out through the exit pipe near the other edge, the entrance and exit pipes passing through the wall of the furnace to the outside where they may be connected with the supply in any suitable manner. As shown, for example, there is a main entrance pipe J surrounding the furnace near the lower ends of the shield and a main exit pipe J' surrounding it near the upper ends. Other means of conveying water to and from the shield may be employed, as desired.

Having thus described our invention, we claim:

1. In a blast furnace, the combination of a wall, a shell surrounding the wall, a metal shield adjacent to the interior surface of the wall near the upper part thereof, and means for supporting the shield from the shell.

2. In a blast furnace, the combination of a wall, a shell upon the exterior thereof, a metal shield adjacent to the wall near the upper part thereof and in the interior of the

furnace, and brackets secured to the shell and engaging the shield to support the same.

3. In a blast furnace, the combination of a wall, a shell surrounding the wall, a metal shield adjacent to the wall near the top thereof and in the interior of the furnace, brackets secured to the shell and extending through recesses in the wall of the furnace, the said brackets at their inner ends being secured to the shield to support the same.

4. In a blast furnace, the combination of a wall, a shell surrounding the wall, a metal shield set into the wall near the top thereof and in the interior of the furnace, said shield

being segmental, brackets secured to the outer shell and extending through the wall of the furnace, the brackets being secured at their inner ends to adjacent segments of the shield at their points of abutment, whereby the shield is supported.

In testimony whereof, we hereunto affix our signatures in the presence of two witnesses.

SAMUEL K. HINE.
WILLIAM R. PHIBBS.

Witnesses:

THOS. PRITCHARD,
KIRTLAND M. FITCH.