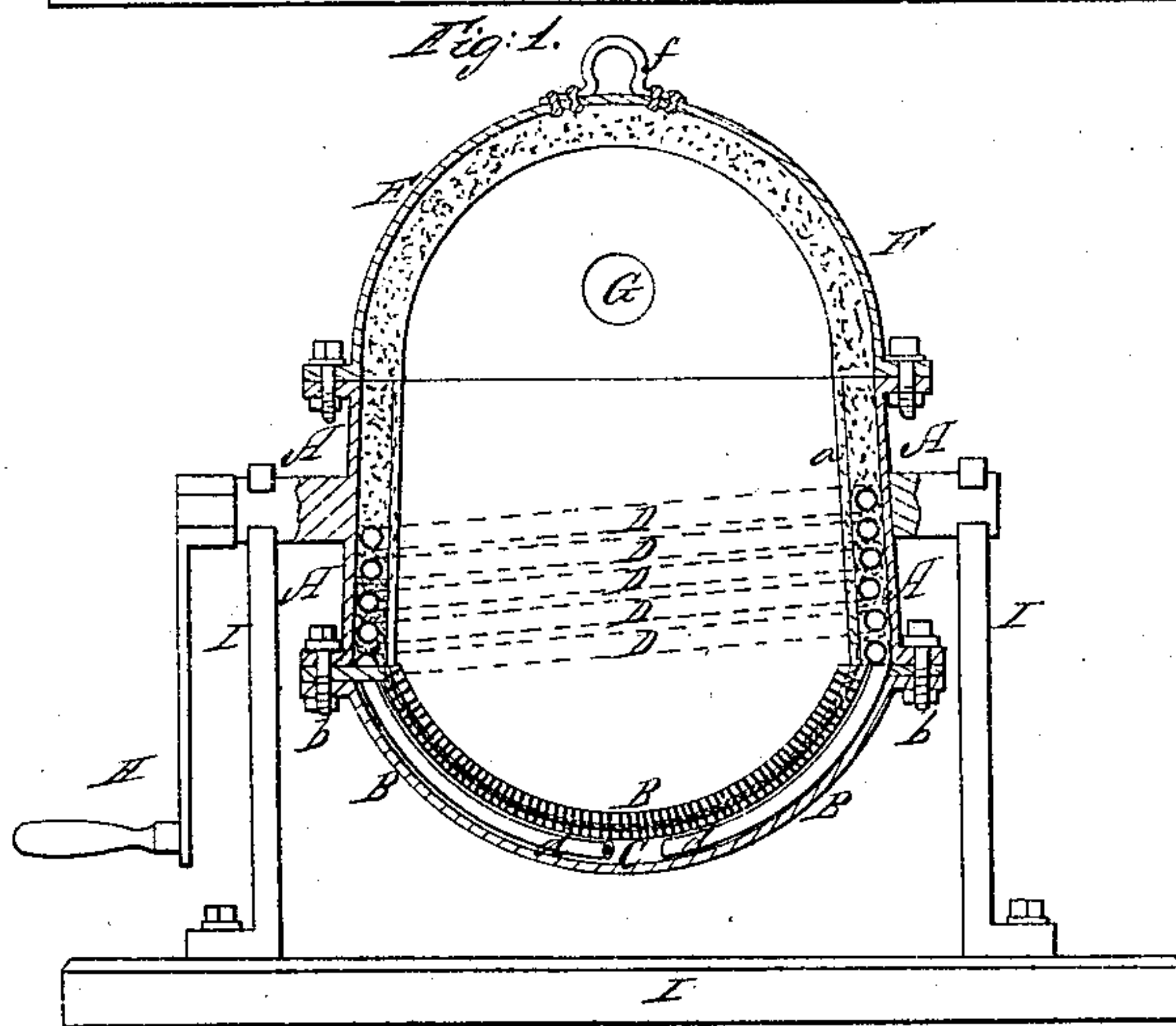
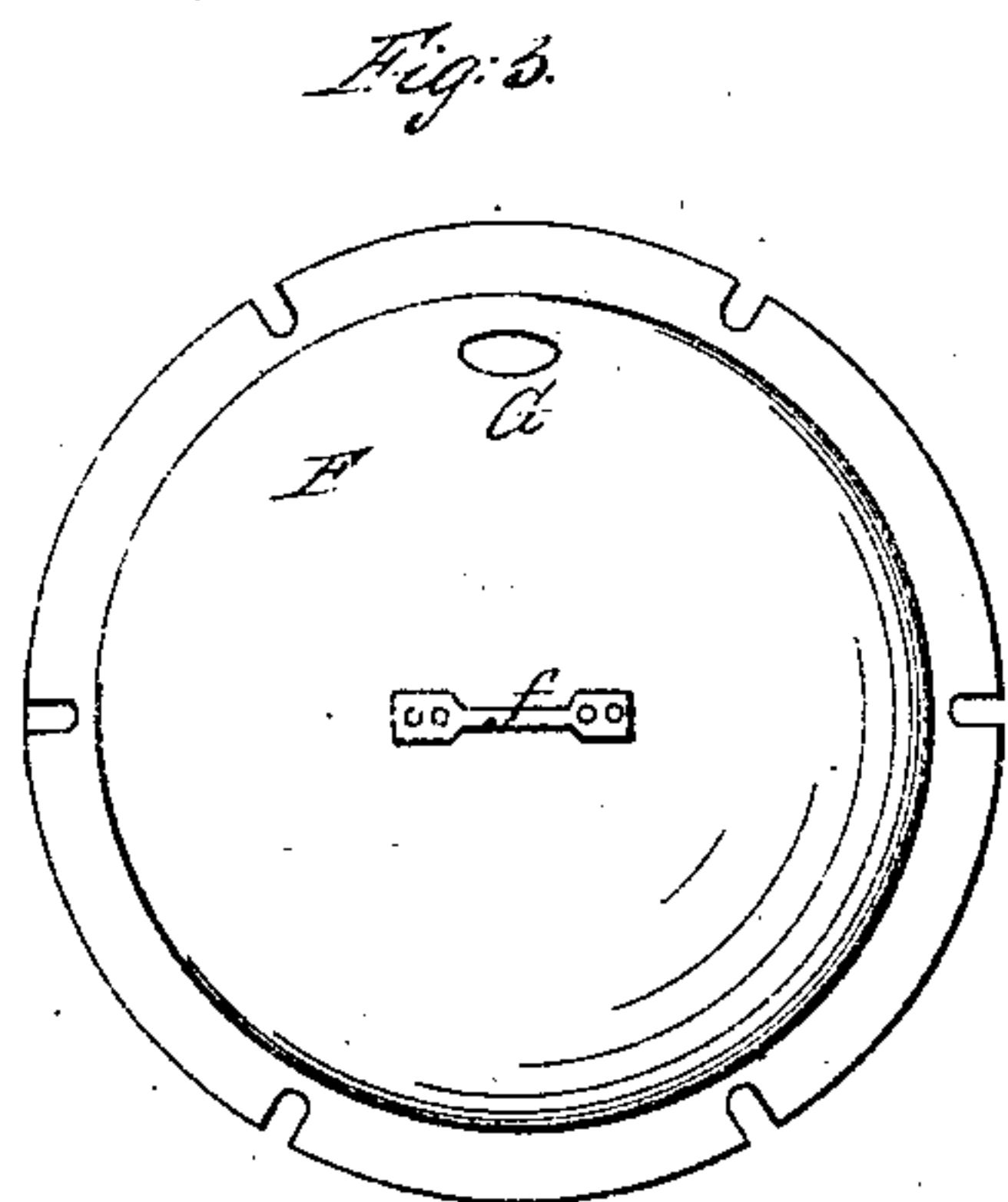
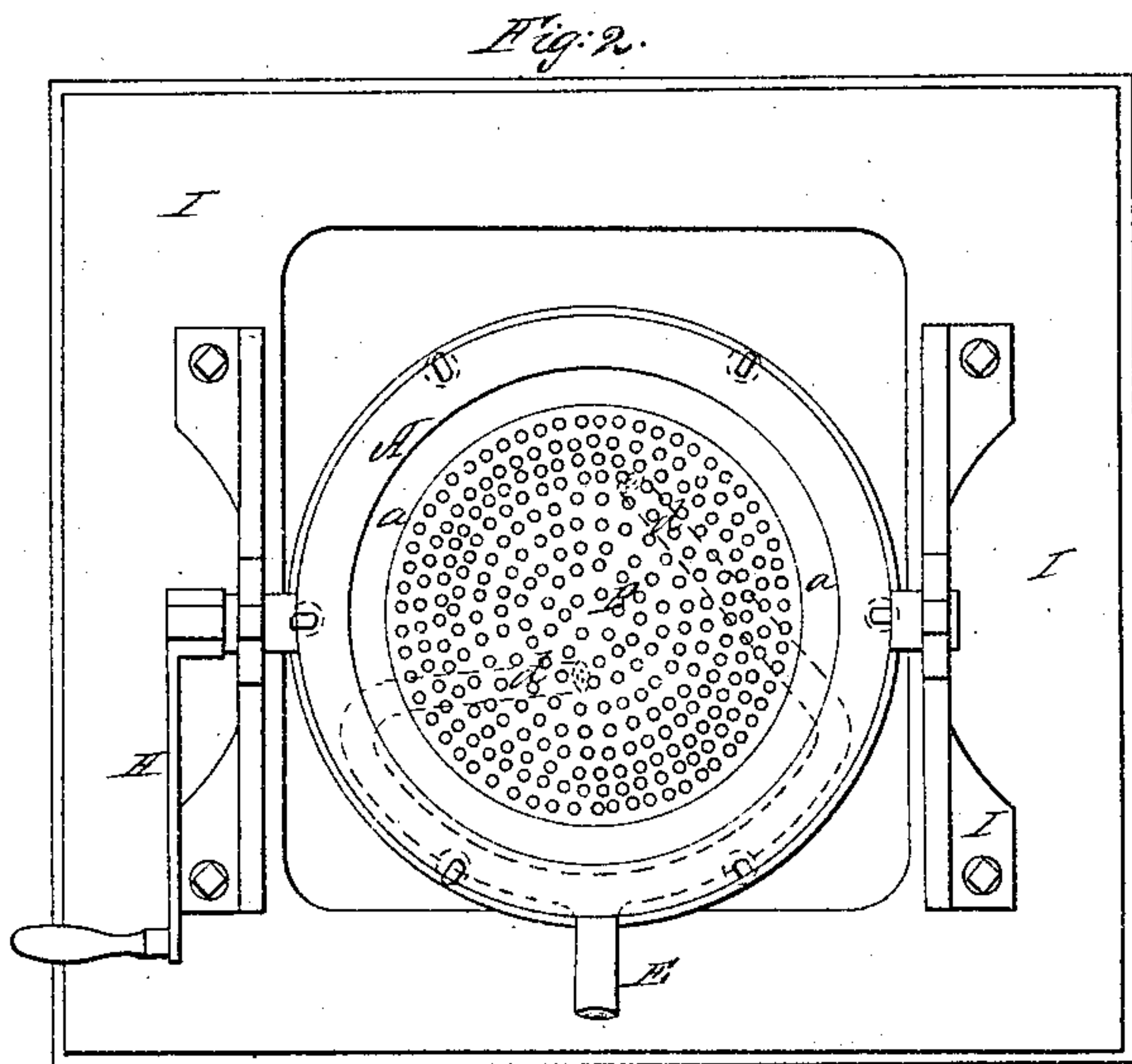


G. W. SWETT
PURIFYING IRON AND STEEL BY MEANS OF BLASTS OF AIR.
No. 39,078. Patented June 30, 1863.



Witnesses:
Alfred
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Inventor:
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UNITED STATES PATENT OFFICE.

GEORGE W. SWETT, OF TROY, NEW YORK.

IMPROVEMENT IN PURIFYING IRON AND STEEL BY MEANS OF BLASTS OF AIR.

Specification forming part of Letters Patent No. 39,078, dated June 30, 1863.

To all whom it may concern:

Be it known that I, GEORGE W. SWETT, of the city of Troy, county of Rensselaer, and State of New York, have invented a new and useful Improvement in the Manufacture of Iron and Steel; and I do hereby declare that the following is a true and clear description of the same, reference being had to the accompanying drawings, wherein like figures correspond with like parts.

The nature of my invention consists in the use of an apparatus, hereinafter fully described, wherein, with perfect safety to the working-men, by introduction of previously-dried air, cast-iron can be quickly refined, strengthened, and brought to a steel-like texture.

In the various methods of introducing atmospheric air into vessels of various shapes for the purpose of depriving the cast-iron of a part of its carbon, in order to refine and strengthen it, or also to convert it thereby into steel, two very great difficulties are met with. One is the danger to which those engaged in the immediate neighborhood of these converting-vessels are exposed when humid air is blown into the melted cast-iron, causing dangerous explosions; the other the slow and insufficient contact of the air with the molten metal. Both these disadvantages I have overcome in the use of my apparatus. The air passes through a coiled tube, between the inner and outer shell of the apparatus to the bottom of the same, and is therein heated and deprived of moisture. To facilitate the drying of the air, the tubes may partially be filled with such substances as absorb moisture—as, for instance, chloride of calcium or other analogous substances. This drying can also be done at or before the admission to the apparatus. Any danger of explosion is thereby obviated. As the heated air passes through the numerous small holes of the false bottom, constructed of good fire-proof material, upward into the heated cast-iron, it is well diffused, brought in the closest contact with the molten metal, and produces in a few moments the desired strengthening effect better and more quickly than by any other device known to me. Another and very important advantage over other apparatus is the one of hav-

ing a removable bottom. Should any of the metal or flux pass through the holes and stop some of the same up, the bottom can be taken off and cleaned. The cover can also be removed and placed on without any difficulty whatever.

For increasing the strength of cast-iron for shells and other objects where great strength of material is required the use of my apparatus presents great advantages, as it can be easily and safely handled, and accomplish the desired object in a very short time—in much shorter time and with more safety than in any other apparatus known to me.

The apparatus consists of the following parts. (See annexed drawings, Figures I, II, and III, of which Fig. I represents a lateral transverse section, Fig. II the view of the interior from above, and Fig. III the view of the cover.)

A is the outer shell of the vessel, made of strong boiler-iron, and *a* the fire-proof lining; B, the removable perforated bottom, with its fire-proof coating, attached to the main vessel by flanges and screws *b*, or in any other suitable manner; C, the air-chamber; D, the coiled air-tubes, with their lower extremities, *d*, entering the said air-chamber; E, the opening through which the air is introduced into said air-tubes; F, the cover, lined with fire-proof material, and attached in any suitable manner to the main vessel, and removable by the eye *f*, with a chain fixed to a crane or other suitable lifting device.

G is the opening through which the gases produced by the passage of the air through the molten metal can escape. This opening serves at the same time the double purpose of admitting the melted cast-iron, as well as also a spout through which the refined metal, by reversing the apparatus, may be poured into the ladles or molds. The vessel can be turned on its axis by the crank H, and is supported by the frame I.

The operation with this apparatus is very simple. Molten cast-iron is poured into the reversed vessel into the cover. The heat of the metal communicates to the interior lining and air-tubes the necessary high temperature. After the necessary quantity of cast-iron shall

have been admitted the air is turned on and the apparatus reversed, so that the air passes through the perforated bottom into and through the melted cast-iron.

Having described the apparatus and its operation, what I claim as my invention, and desire to secure by Letters Patent, is—

The use of the apparatus above described in the manner and for the purposes above specified.

GEORGE W. SWETT.

Witnesses:

A. L. FLEURY,
CHAS. BALL.