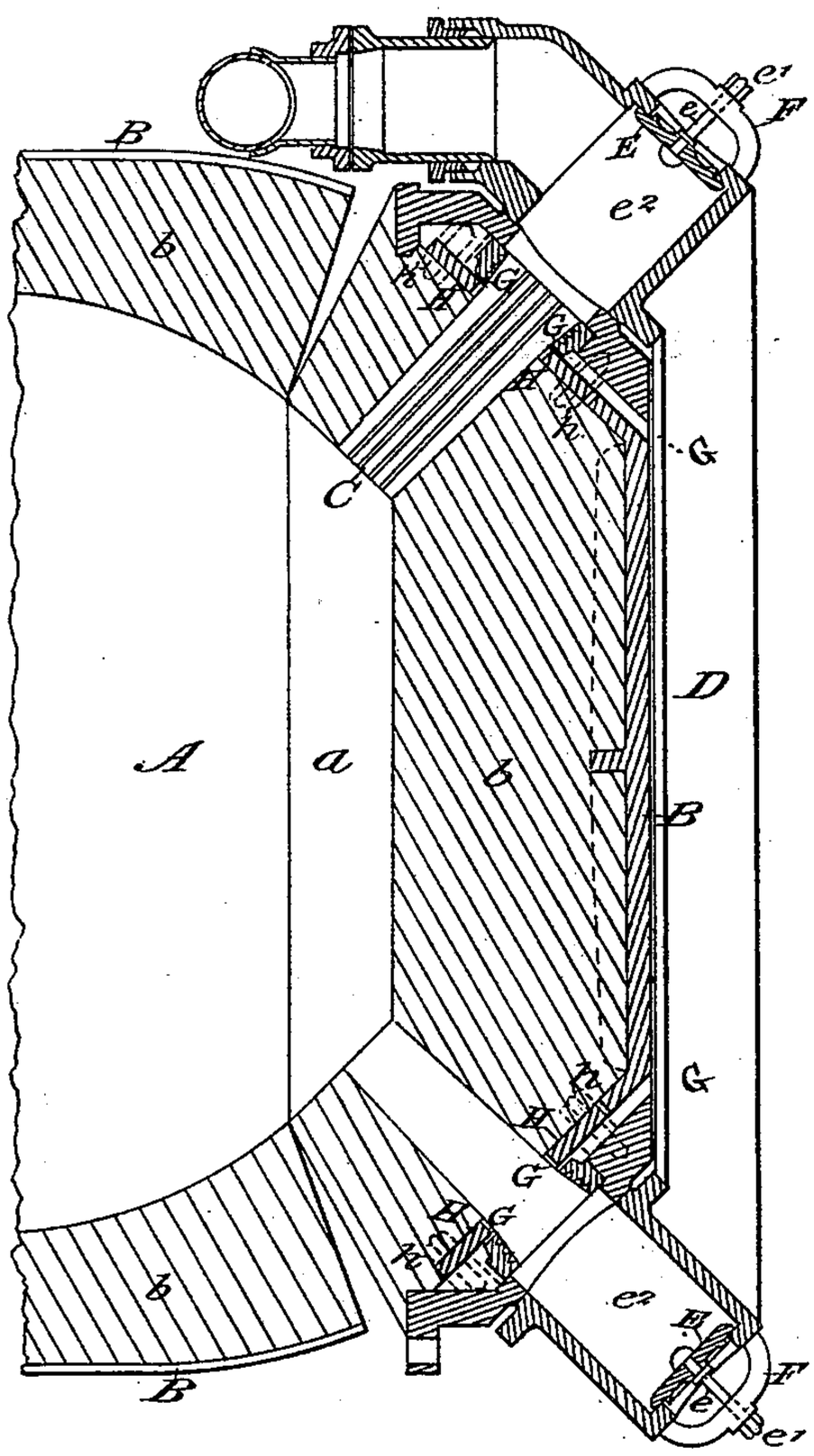
2 Sheets—Sheet 1.

J. O. STANTON & C. F. MANNESS.

Converter.

No. 233,571. **Patented Oct. 19, 1880.**

FIG. 1.



WITNESSES:

Charles C. Stetson

E. B. Bolton

INVENTOR:

John O. Stanton and
Charles F. Manness
by their attorney E. B. Stetson

2 Sheets—Sheet 2.

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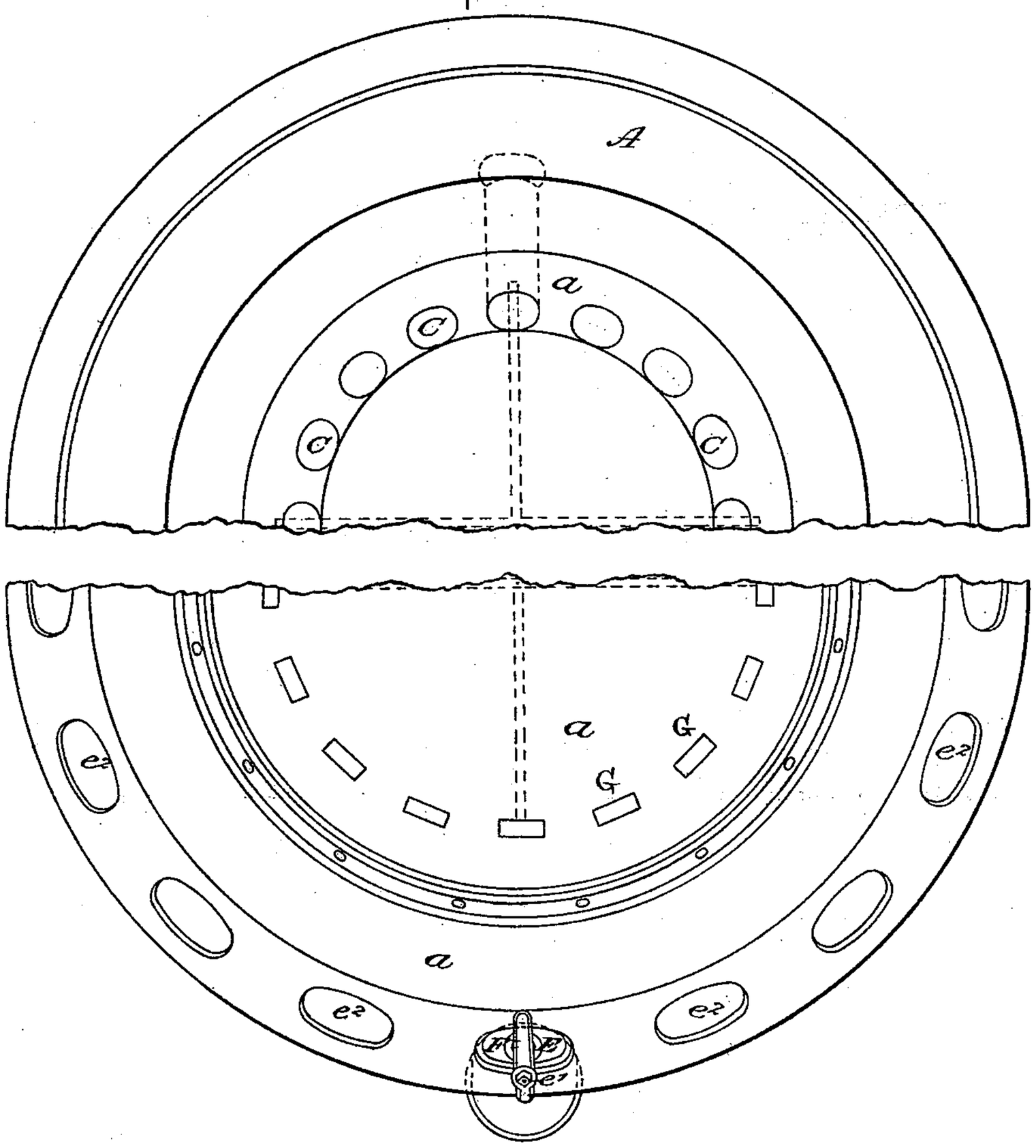
Converter.

No. 233,571. **Patented Oct. 19, 1880.**

FIG. 2.



INVENTOR:

John O. Stanton, and
Charles F. Manness,
by their attorneys E. B. Bolton.

WITNESSES:

E. B. Bolton
Charles C. Stetson

UNITED STATES PATENT OFFICE.

JOHN O. STANTON AND CHARLES F. MANNESS, OF SCRANTON, PA.

CONVERTER.

SPECIFICATION forming part of Letters Patent No. 233,571, dated October 19, 1880.

Application filed July 25, 1879.

To all whom it may concern:

Be it known that we, JOHN O. STANTON and CHARLES F. MANNESS, of Scranton, Lackawanna county, in the State of Pennsylvania, have invented certain new and useful Improvements relating to Converters; and we do hereby declare that the following is a full and exact description thereof.

Henry Bessemer and others have devised and successfully worked out a method of treating melted iron in large and peculiarly-constructed vessels termed "converters," where it is blown with air injected through passages from below in such manner as to materially change the nature of the melted metal. It is largely used for the manufacture of steel.

Our improvements relate to the construction of the bottoms of the converters.

In our construction the bottom is detachable, as usual, from the main body of the converter, and is fastened and disconnected at will by suitable bolts or other strong fastenings. As in all other bottoms, the air may be received at one point from a blowing-engine capable of furnishing a constant blast of sufficient power, and is distributed in a case or box to the several tuyeres; but we have modified the construction and arrangement materially. The joint or division between our bottom and the body is not at the extreme base, but is a little above the base. The nozzles or discharging ends of the tuyeres are in the side surface, near the edge of the bottom. Each tuyere stands at an angle of about forty-five degrees, and injects the air, with the great force due to the blowing, in a correspondingly-inclined direction. The several streams of air under pressure converge together, instead of, as usual, being discharged vertically from the bottom.

Our arrangement allows a large clear space under the main body of the bottom. We provide apertures in the bottom, one corresponding to each tuyere, located under the inclined tuyere, and so arranged that in case of failure of the tuyere from any cause the melted metal, on flowing backward or outward, will readily escape through this aperture. Among other advantages this shows instantly when a failure has occurred and which is the defective tuyere. We provide hand-holes, one for each tuyere, through which the defective tuyere may be readily examined, repaired, or exchanged.

The accompanying drawings form a part of this specification, and represent what we consider the best means of carrying out the invention.

Figure 1 is a central vertical section through the lower part of a converter with my improvement. On the right-hand side the tuyere is in place for use. On the left-hand side the cavity for the tuyere is shown empty. Fig. 2 is duplex. The upper half is half of a plan view seen from above. The lower half is half of a plan view seen from below.

Similar letters of reference indicate like parts in both the figures.

The converter is made, as usual, with a stout casing or shell of iron and a thick lining of fire-brick, ganister, or other refractory materials.

A *a* represent the body of the converter.

It will be understood that the trunnions, the means of tilting the body, the bolts, the connections to lead the blast through one or both the trunnions, and thence to the bottom, as also the blowing-engine or means for producing wind—in short, all the parts not represented—may be of any ordinary or suitable construction.

B is the cast-iron shell or stout frame-work, and *b* the brick and ganister lining of the converter-bottom. C C are tuyeres of any ordinary or suitable construction.

Instead of being set vertically in the bottom, either evenly distributed or arranged around the periphery in vertical positions, and connected to a wind-chest which is under the flat portion of the bottom, our tuyeres are set in the inclined positions represented. They are set so far out from the center that they discharge in the sides or walls, so to speak, instead of in the flat portion of the bottom, and by reason of their greatly-inclined positions the wind-chest D, which supplies them with blast, is or may be an annular ring, having a large open space within it, which allows access to the shell B of the bottom.

The shell B is formed with a narrow but sufficiently liberal opening, G, at each tuyere-hole, to allow a free escape of any melted metal which may flow down in the place of or out-

side of the tuyere. This aperture is bounded on the inner face by a plate, H, which is held by bolts *h*, and can be removed and replaced at pleasure to introduce the tuyere. The wind-chest presents an inclined section, as shown.

In line with each tuyere C is a hand-hole, e^2, stopped by a tight cover, E, applied from the inside, and confined by means of a yoke, F, which receives the force by a nut, e', threaded on the stem *e*. The hand-holes are of elliptical form, and the covers E are of corresponding form. They may be introduced and removed by turning them in the proper positions, as will be understood.

Our construction allows convenient access to the main surface of the bottom. It injects the air from the periphery of the bottom with a strong inward inclination. We believe that the horizontal motion given to the entering air by causing it to move farther through the dense melted metal before its emergence and escape at the surface makes it more efficient and useful in a given depth of metal. The tuyeres will last longer than usual. They are less severely wrought on by the falling of the intensely-agitated iron. We believe that the plunging and falling of the violently-agitated metal is a chief cause of the rapid destruction of tuyeres and of the adjacent ganister in ordinary converters. Our invention greatly reduces these destructive influences.

Our invention, by injecting the air at the periphery and directing it inward, insures a thorough action upon all the melted mass.

Our ports G perform an important function. By allowing the air to escape they serve as a tell-tale to indicate any breakage or defective action of a tuyere. If the tuyere is broken so as to discharge air or melted metal, the port G instantly reveals the fact. If the ganister around a tuyere is burned or broken away so as to allow the melted metal to exude, this fact becomes instantly apparent from the outside by its dropping or flowing through the port G.

The air, by being caused to move not only vertically but radially through the mass of melted metal, is appreciably more efficient. Less air, and especially less time, are required to produce a given change in the nature of the melted mass.

The difference in the cost of renewing bottoms, and especially the delay in the use of the apparatus, are very important.

Our bottoms will stand twenty or more heats, while the ordinary bottoms burn out in from five to ten heats.

It is easy to renew the tuyeres. It is especially easy to learn the locality of a breakage or other failure, and to stop a tuyere by introducing fire-clay through the corresponding hand-hole. One man can blank one of our tuyeres in two or three minutes.

We can fit up a bottom ready to go on in three hours, using no ovens. This is much less time than is required with the ordinary style of bottoms.

When the iron port adjacent to our tuyeres is burned out we only destroy a plate weighing twenty-five to fifty pounds, on renewing which we are ready to work again.

We claim as our invention—

1. In a Bessemer converter, the inclined tuyeres C, mounted in radial positions in the base, for the purposes specified.

2. The converter-bottom B *b*, provided with a series of converging tuyeres, C, extending through the lining in the sides or inclosing-wall, as herein specified.

3. In a converter, the shell B, provided with a port, G, leading to the exterior of the tuyere, in combination with the tuyere C, wind-chest, and ganister or lining *b*, and arranged to serve therewith, as herein specified.

4. In a converter, the detachable part B *b*, forming the base and a portion of the upright part or sides, the series of inclined tuyeres C, and the separate removable plates H, combined and arranged as herein specified.

5. In combination, the converter-body A *a*, a bottom, B *b*, with its ports G, and the tuyeres C, plates H, wind-chest D, and removable hand-hole covers E and their fastenings, as herein specified.

In testimony whereof we have hereunto set our hands this 5th day of July, 1879, in the presence of two subscribing witnesses.

JOHN O. STANTON.
C. F. MANNESS.

Witnesses:
W. C. DEY,
CHARLES C. STETSON,