

No. 695,737.

Patented Mar. 18, 1902.

J. S. KLEIN.
CONVERTER.

Application filed May 18, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

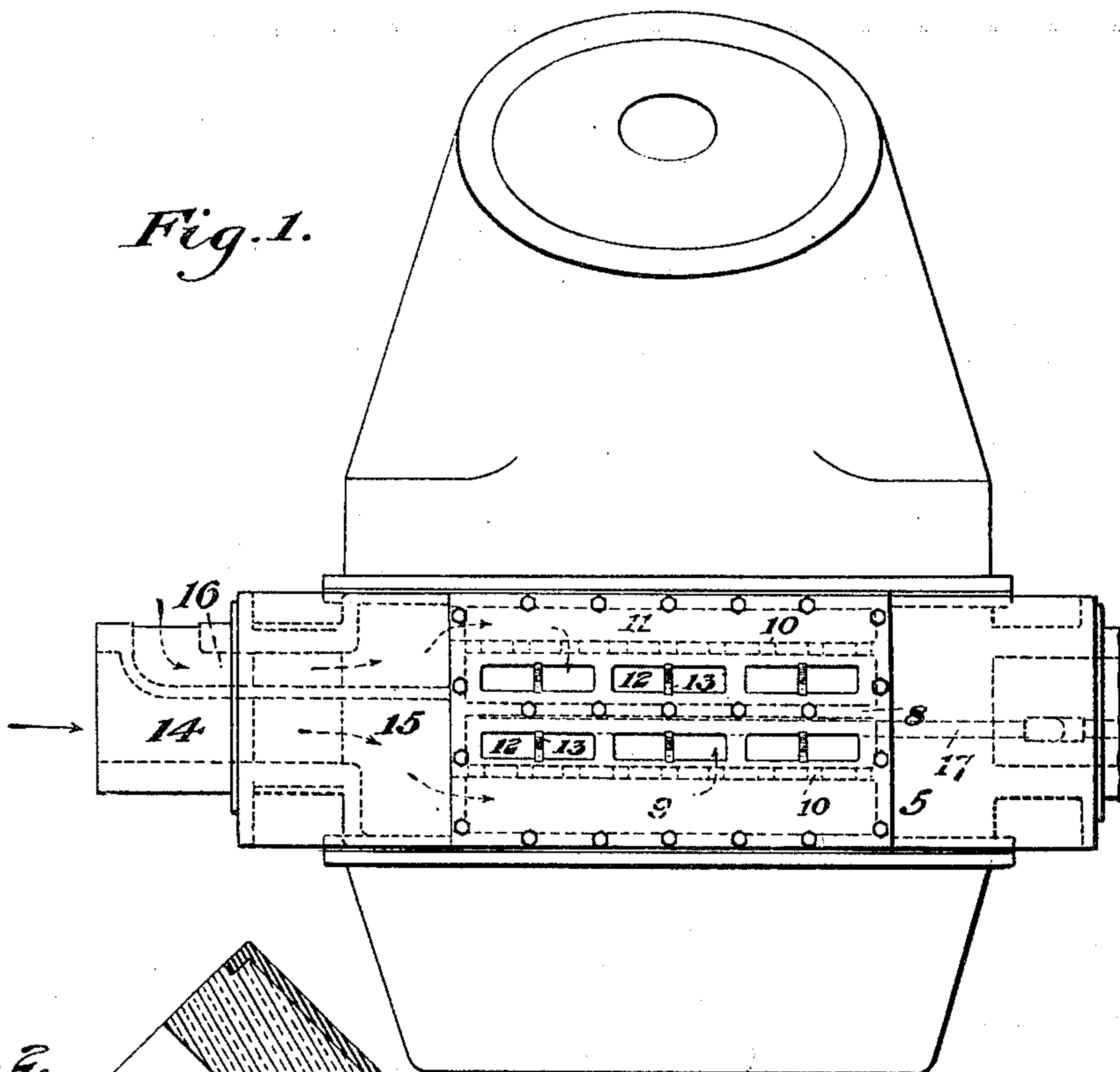
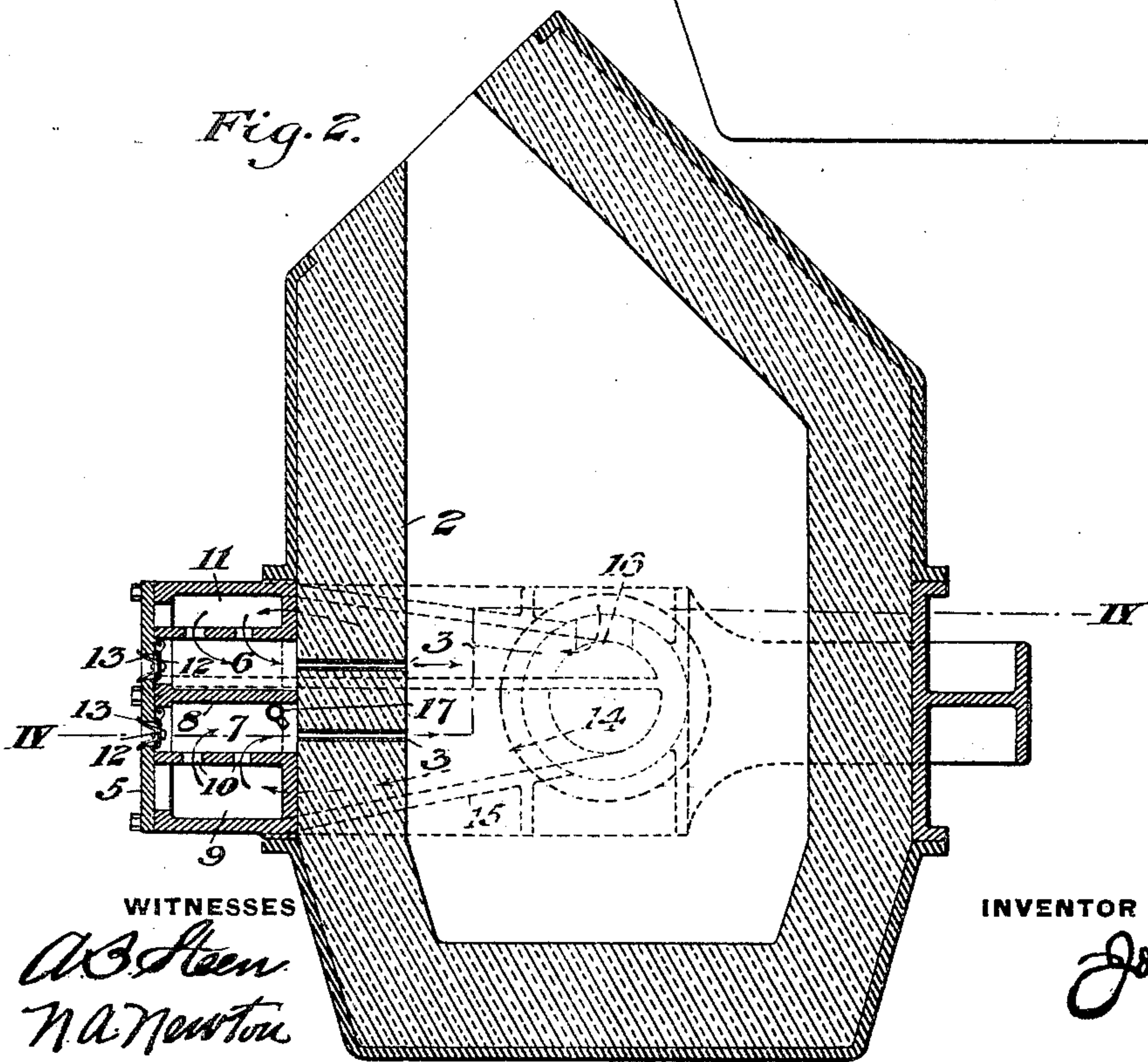


Fig. 2.



WITNESSES

A. B. Steen
N. A. Newton

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(No Model.)

2 Sheets—Sheet 2.

Fig. 3.

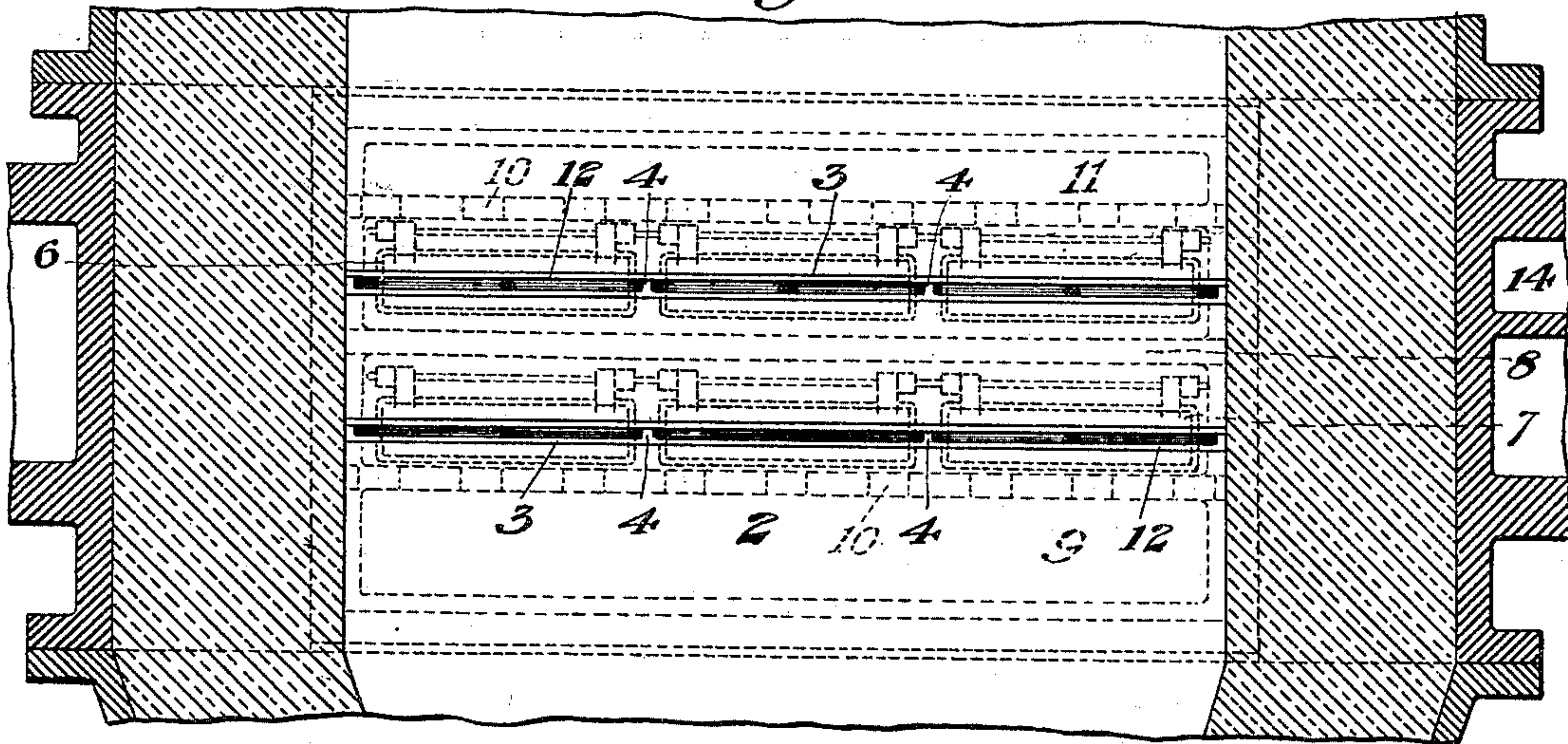
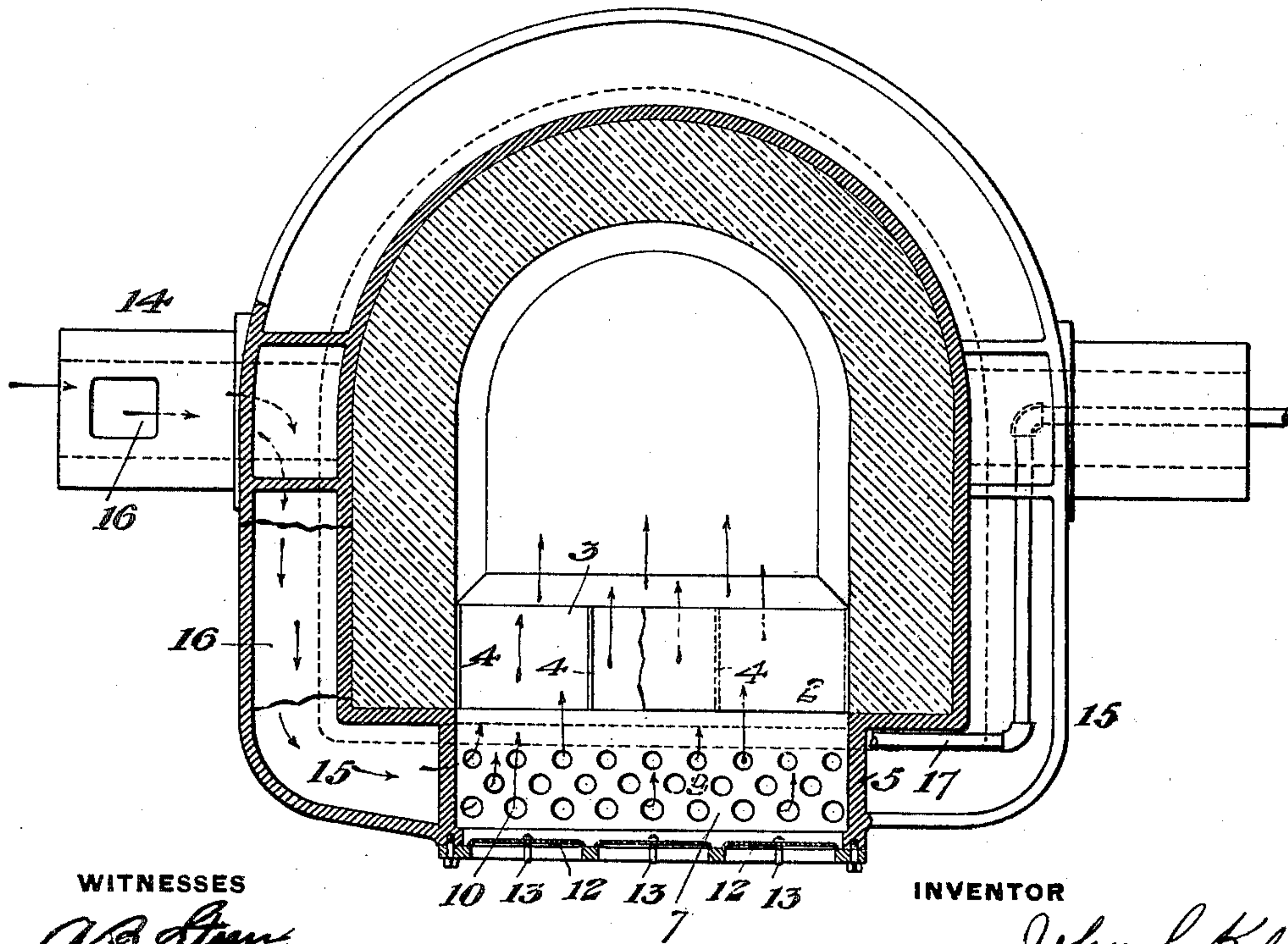


Fig. 4.



WITNESSES

A. B. Stone
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UNITED STATES PATENT OFFICE.

JOHN S. KLEIN, OF OIL CITY, PENNSYLVANIA.

CONVERTER.

SPECIFICATION forming part of Letters Patent No. 695,737, dated March 18, 1902.

Application filed May 18, 1900. Serial No. 17,114. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. KLEIN, of Oil City, in the county of Venango and State of Pennsylvania, have invented a new and useful Improvement in Converters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a rear elevation of my improved converter. Fig. 2 is a central vertical section of the same. Fig. 3 is an enlarged partial vertical section showing the blast-slots, and Fig. 4 is a horizontal section on the broken line IV IV of Fig. 2.

My invention relates to the class of side-blowing converters in which the blast is driven horizontally at or slightly above the level of the bath and is designed to prevent accumulation of slag, such as occurs around the twyers heretofore employed, and, further, to facilitate the inspection of the operation and give easy access to the interior of the converter; also, to improve the construction of the converter and provide means for easily and quickly heating it preparatory to blowing and for controlling the blast. Heretofore in this class of converters the air has passed in through separated twyers built into the side walls of the receptacle. With this construction I have found that the swirling or eddy action thus induced upon the surface of the bath will cause slag to collect and accumulate at the blowing side between the mouths of the twyers. As these accretions form and enlarge they clog up the twyers and injure their action and reduce the area of blast contact-surface on the bath. I have overcome this difficulty by introducing the blast in the form of a thin broad sheet, which extends substantially the whole width of the blowing side of the converter. The slag and impurities are thus forced to the opposite side and clogging of the twyers prevented.

In the drawings, in which I show the preferred form of my invention, the converter, which is of the usual form, is provided with a flat vertical wall 2 at one side. In this wall are built the blast openings or slots 3, of which I have shown two at different levels, though it will be understood that one or more slots

may be used, if desired. These slots are preferably formed of two flat plates, either of which may be provided with separating studs or lugs 4, which support the upper plate and hold them apart without materially changing the area of the blast-outlet or interfering with the continuous sheet of air blown in. I may, however, form these slot-openings by means of special bricks, which may extend the entire length of the slots and be spaced apart by suitable studs. To this flat side of the converter is secured the blast-box 5, having an upper chamber 6 communicating with the upper blast-slot and a lower chamber 7, separated therefrom by a partition 8 and into which the lower slot directly opens. The air for the lower chamber 7 enters a chamber 9, and thence passes into chamber 7 through a set of openings 10. I prefer to use this indirect connection with the blast-slot, since the perforated partition breaks up the entering currents and produces a nearly even pressure throughout the length of the slots. A smaller upper chamber 11 is connected with the chamber 6 in a similar manner. At the rear end of each of the chambers 6 and 7 I provide a series of swinging doors 12, which are normally held shut by the pressure within the chambers, but may be easily and quickly opened when the blast is turned off, so as to allow insertion of a bar through the blast-slot or to examine the height or condition of the bath. To prevent these doors opening when it is desired to tip the converter during the blow or when emptying, I preferably employ swivel-buttons 13, secured to each door and which may be turned into the positions shown in Figs. 1 and 2 to hold the doors closed. On turning any one of these buttons the door may be swung inwardly. The air-supply for the lower slot is preferably led to the hollow trunnion 14, and thence through a passage in the surrounding casting 15 to the chamber 9. The air-supply for the upper slot is led to an upper cavity 16 in the hollow trunnion, which is similarly connected through the main belt with the upper chamber 11.

To facilitate the heating of the converter, I preferably employ a pipe 17 for liquid fuel or gas, which extends through the opposite

trunnion, and thence into the chamber 7, being provided with a number of depending nozzles just above one of the blast-slots. A small fire being placed in the converter and
 5 oil or gas supplied with the blast, the converter can be heated up in a very short time, the air carrying the oil or gas into the converter-body with it. The main and supplemental blast pipes are preferably provided
 10 with regulating-valves by which the pressure or amount of air admitted to each slot may be under the perfect control of the operator.

The advantages of my invention flow mainly
 15 from the use of the substantially continuous blast-slot, which prevents the collecting of slag upon that side of the converter. I also obtain a more even and more rapid action of the air upon the metal by reason of a greater
 20 surface of the bath being exposed to the action of the air-blast. In tilting the converter into the position for blowing one of the wind-box doors may be held open, and the operator can thus stop the converter at the right
 25 point and turn on the blast, the door then being closed. If any slag or vitreous impurities obstruct the slots at any time it is only necessary to shut off the blast and introduce a thin bar through one of the doors
 30 and remove the obstruction. The blast can then be turned on and the door will close under the pressure. After the blow has been well started the holding-buttons are preferably turned to secure the doors or valves in
 35 closed position in order to prevent a blast of hot air from escaping in tilting the converter after the blast is shut off. In blowing the various amounts of metal several slots may be used at different heights, and any slot not
 40 used may be stopped off for any particular blow.

The converter may be of any desired shape or form, though I prefer one having a flat side, as shown, since this gives the longest
 45 possible slots and allows the blast to act upon the entire surface of the bath in a continuous sheet.

The form and arrangement of the blast-openings may be varied within the scope of
 50 my invention, as I consider myself the first to use a substantially continuous sheet of air, and many other variations may be made in

the form and arrangement of the parts without departing from my invention.

I claim—

1. A side-blowing converter, having at an intermediate part of its height a surrounding supporting-band provided with trunnions, said converter being provided with a substantially continuous blast-slot extending
 60 across one side intermediate of its height, continuous lining-plates for the slot, spacers to hold the plates apart, and a wind-box covering the slot; substantially as described.

2. A side-blowing converter supported at
 65 an intermediate part of its height by a surrounding band provided with trunnions, said converter having a rammed lining cut through at one side by a substantially continuous slot extending across one side of the converter at
 70 a point intermediate of its height, said slot being arranged to direct air upon the metal bath at or near its surface to refine it, a metal lining-plate for the slot, and a wind-box covering said slot; substantially as described.

3. A side-blowing converter having a substantially continuous slot across one side thereof above the bottom, a wind-box covering the slot, a rear cover-plate for the box, having separated openings therein arranged
 80 to give access to all parts of the slot, detachable closures for the openings, and locking mechanism for the closures; substantially as described.

4. A side-blowing converter having a wind-
 85 box provided with a rear cover-plate having a hole therein, a swinging inside door for the opening, and a locking device arranged to lock the door in closed position; substantially as described.

5. A converter having two substantially continuous blast-slots extending across one side and having metal linings, a wind-box having two separated chambers leading to the
 90 two tuyers respectively, and separate air-chambers extending along each wind-box chamber and connected therewith by a series of holes; substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN S. KLEIN.

Witnesses:

N. A. NEWTON,
 A. B. STEEN.