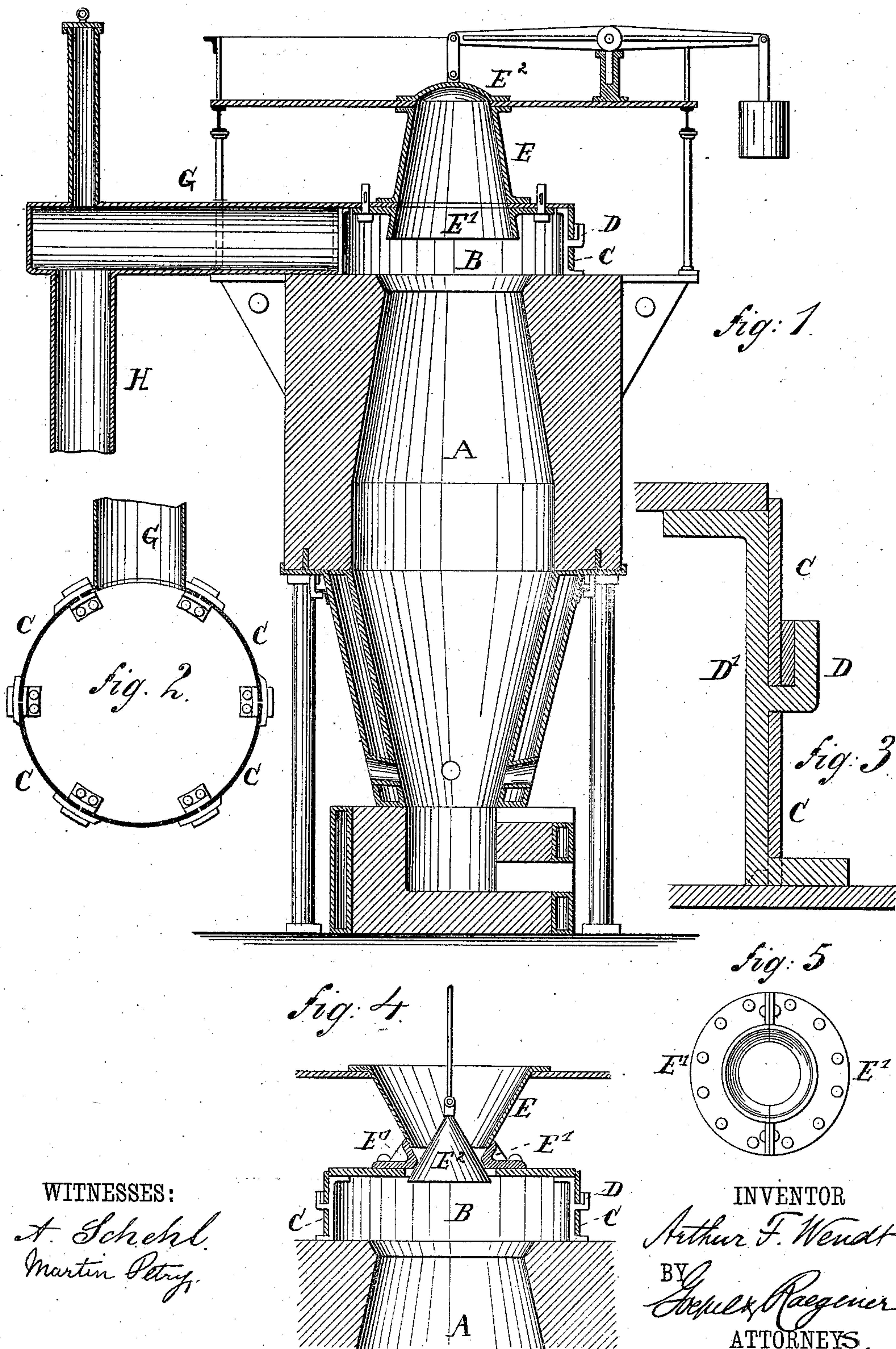


(No Model.)

A. F. WENDT.  
BLAST FURNACE.

No. 305,553.

Patented Sept. 23, 1884.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ARTHUR F. WENDT, OF NEW YORK, N. Y.

## BLAST-FURNACE.

SPECIFICATION forming part of Letters Patent No. 305,553, dated September 23, 1884.

Application filed April 19, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR F. WENDT, of the city, county, and State of New York, have invented certain new and useful Improvements in Blast-Furnaces for Reducing Zinc Ores, of which the following is a specification.

The blast-furnaces used in the smelting of iron or manganiferous iron ores containing a high percentage of zinc have been provided with a top chamber and an open iron funnel, through which a large part of the blast-furnace gases escaped. The chamber has removable iron side plates, which are retained in position by wedges, on which side plates zinc is condensed, and from the surface of which it is removed and collected from time to time.

Heretofore it has been supposed that the iron top of the furnace had to be open for charging the stock of ore, fuel, and flux, and allowing the escape of some of the zinc-bearing gases, while the remaining portion of the gases is drawn off and conducted through the flue and a downcomer into the zinc-condenser, and from the same to the hot-blast stoves for heating the air blown into the blast-furnace and to the boilers for generating part of the steam by which the blowing-engine is operated.

The object of my invention is to so improve the blast-furnaces used for working up ores containing zinc or "residuum," or other zinciferous ores, that the top is entirely closed, and that practically all the volatilized zinc is condensed and collected, and that all the blast-furnace gases be conducted to hot-blast stoves and boilers for utilization.

The invention consists of a blast-furnace for reducing ores containing zinc, having an iron top chamber with removable side wall plates, a supply-hopper, and a cover closing the opening of the hopper. Detachable angle-plates are arranged at the point of connection of the hopper with the top chamber.

In the accompanying drawings, Figure 1 represents a vertical central section of my improved blast-furnace for reducing ores containing zinc. Fig. 2 is a horizontal section through the top chamber of the same. Fig. 3 is a detail vertical transverse section of the same. Fig. 4 is a modified form of the top chamber, and Fig. 5 a detail of Fig. 4.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a blast-furnace of the usual construction, which is provided at the top part with a chamber, B. The side walls of the chamber B are formed of removable iron plates, C, which may be constructed in sections and held in position by means of wedges that are driven between the side plates and lugs D, said lugs being part of the supporting-posts D', as shown in Fig. 3. The side plates C can be readily removed by loosening the wedges, so that the zinc deposited thereon can be broken off and removed. The supply-hopper E rests on the top of the chamber B and extends to the charging-floor. A circular angle-plate, E', is secured to the under side of the top plate of the chamber B, and secured thereto by bolts, so that it can be removed and replaced by a new one when burned out. The charging-opening of the hopper E is tightly closed by a bell-shaped cover, E<sup>2</sup>, that is balanced in suitable manner, so as to be readily opened or closed. A horizontal flue, G, conveys the gases from the top chamber, B, to the downcomer H and the zinc-condenser, from which they are conducted to the hot-blast stoves and boilers, where they are burned for heating the air blown into the furnace and generating the steam for running the blowing-engine.

The advantage of the closed top chamber, B, is that a larger volume of gas is necessarily carried through the flue G and downcomer H, and that the zinc which formerly escaped with a certain volume of gas through the opening of the top chamber can be collected, so that, for example, from one and one-half to two per cent. more, or from five to six per cent. of the six to seven per cent. of zinc contained in residuum, can be saved, whereas formerly the result was only from three and one-half to four per cent. A further advantage is that by the increased volume of gas which is conducted to the hot-blast stoves higher temperature can be imparted to the hot blast. In other words, it admits the raising of the air blown into the furnace to a higher degree of heat, and there results the more complete reduction of the ores in the furnace and smaller losses in the slags.



Thus, while formerly the average of spiegel-eisen made out of residuum from franklinite was fifteen to eighteen per cent., it is by the use of a closed-top furnace increased to from  
5 eighteen to twenty-one per cent.

A modified form of my improved closed top for furnaces is shown in Fig. 4, in which the hopper E is supported by the charging-floor and made to rest on semicircular angle-plates E',  
10 which are fastened upon the top of the iron chamber B of the furnace. The angle-plates E' are bolted together, as shown in Figs. 4 and 5. These angle-plates have a tapering face for the conical cover E<sup>2</sup>, which is raised or low-  
15 ered by suitable means. The lowering of the cone E<sup>2</sup> allows the ore and fuel to be charged directly into the furnace, while the raising of the cone closes the supply-hopper. The advantage of this construction is that the angle-plates can  
20 be conveniently removed at any moment from the outside of the furnace and replaced by new ones when burned out.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a blast-furnace for smelting or reduc- 25  
ing ores containing zinc, the combination of a furnace, A, an iron top chamber, B, having removable side-wall plates C, a supply-hopper, E, and a cover, E<sup>2</sup>, closing the opening of the supply-hopper, substantially as set forth. 30

2. The combination of a blast-furnace, A, a top chamber, B, having removable side-wall plates C C, hopper E, detachable angle-plates E', and a cover, E<sup>2</sup>, closing the supply-hopper E, substantially as set forth. 35

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ARTHUR F. WENDT.

Witnesses:

MARTIN PETRY,  
SIDNEY MANN.