(No Model.)

C. SAHLER.

CUPOLA FURNACE.

No. 386,269. Patented July 17, 1888.

Fig. 1

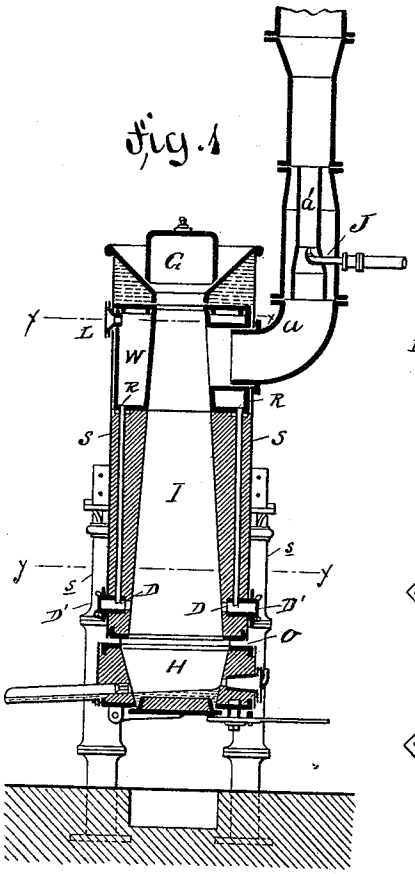


Fig. 2

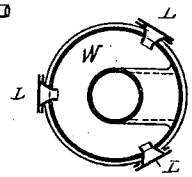


Fig. 5

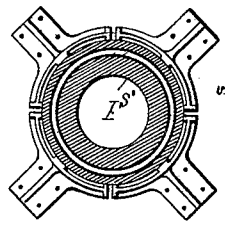


Fig. 4

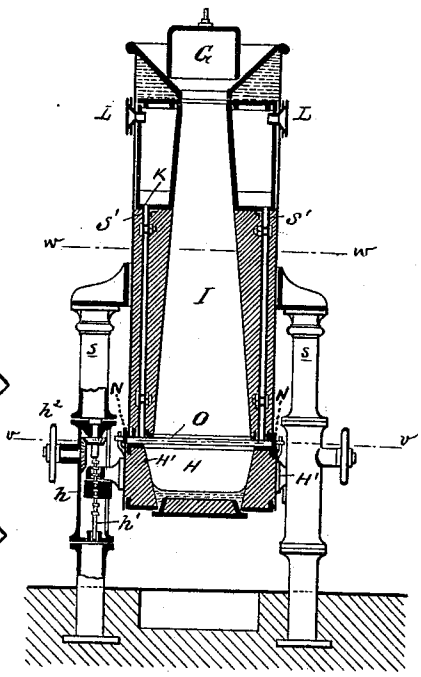


Fig. 3

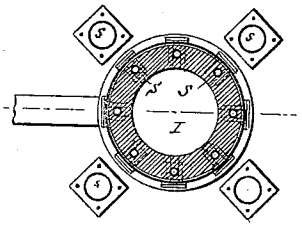
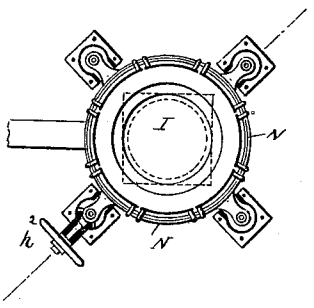


Fig. 6



WITNESSES:

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UNITED STATES PATENT OFFICE.

CARL SAHLER, OF COLOGNE, GERMANY, ASSIGNOR TO FRIEDRICH AUGUST HERBERTZ, OF SAME PLACE.

CUPOLA-FURNACE.

SPECIFICATION forming part of Letters Patent No. 386,269, dated July 17, 1888.

Application filed September 5, 1887. Serial No. 248,774. (No model.) Patented in Germany August 11, 1887, No. 42,580, and in England August 26, 1887, No. 11,613.

To all whom it may concern:

Be it known that I, CARL SAHLER, a subject of the King of Prussia, residing at the city of Cologne, Germany, have invented certain new and useful Improvements in Cupola-Furnaces, (for which Letters Patent have heretofore been granted to me by the Government of Germany, dated August 11, 1887, No. 42,580, and Great Britain, dated August 26, 1887, No. 11,613,) of which the following is a specification.

This invention relates to cupola-furnaces; and the object of my invention is to provide means on furnaces for heating the air that is conducted through pipes into the bottom part of the shaft.

The invention consists in a furnace having the lower part of the shaft built of masonry and the upper part of metal, said metal being surrounded by a casing in which the air is heated.

The invention also consists in the construction and combination of parts, as will be fully described hereinafter, and finally be pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional elevation of my improved cupola-furnace. Fig. 2 is a sectional plan view of the same on the line *x x* of Fig. 1. Fig. 3 is a sectional plan view on the line *y y* of Fig. 1. Fig. 4 is a vertical sectional view of a modified construction of my improved cupola-furnace. Fig. 5 is a sectional plan view of the same on the line *w w* of Fig. 4. Fig. 6 is a sectional plan view of the same on the line *v v* of Fig. 4.

Similar letters of reference indicate corresponding parts.

The shaft I is supported by the four columns *s*, and below it the hearth H is located, which is provided with radial lugs H′, projecting through vertical slots in the columns and resting on nuts *h*, mounted on vertical screw-spindles *h′* in the columns *s*, which screws can be turned by hand-wheels *h²* on the outside of the columns. The hearth can thus be raised or lowered by turning the hand-wheels, and thus the slot or annular opening O between the top edge of the hearth and the bottom of the shaft can be decreased or increased in width. The hopper-shaped top of the shaft can be closed by the bell-shaped cover G. The upper part of the shaft is composed of an annular metal air-chamber, W, which is provided at the top with the air-inlet openings L and at the bottom with the outlet-openings R, which are connected by vertical pipes S, embedded in the masonry of the shaft, with the tuyeres D located a short distance above the bottom of the furnace-shaft, and are provided on their outer ends with the hinged doors D′.

In place of providing the pipes S and tuyeres D, the chamber W may be provided with a circular bottom opening, K, as shown in Fig. 4, which opening is in communication with a vertical annular channel, S′, in the masonry of the shaft, the bottom of said channel being in the bottom edge of the shaft. With this construction sliding segmental plates N N must be provided on the outside of the shaft, at the bottom, to permit of closing more or less the annular slot O between the hearth and the bottom of the shaft. The outlet-pipe *a*, which conveys the gases, &c., out of the shaft, contains the pipe *a′*, of less diameter, and in said pipe *a′* the steam-jet pipe J is provided, thus forming a steam-jet suction device in the said outlet-pipe *a*. The annular slot is closed or opened only slightly, according to the degree of heat desired in the shaft, and the steam-jet apparatus started, whereby a vacuum is created in the shaft. The cold air is drawn through the openings L into the chamber W, where it is heated, and passes through the pipes S to the tuyeres D, whereby it is heated still more, and this heated air then passes into the shaft at the bottom.

In the construction shown in Figs. 4, 5, and 6 the hot air passes from the bottom of the channel S′ directly into the shaft. In this construction the hearth and bottom of the shaft must always be separated by a short distance, as otherwise the lower end of the channel S′ would be closed by the top of the hearth.

To prevent too much cold air passing into the shaft through the slot O, the segments N have been provided. In place of the steam-jet apparatus, any other suction device may

be used for drawing the air into the furnace, or the air-suction device may be used in combination with an air-forcing device.

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

1. A cupola-furnace having the lower part built of masonry and its upper part of sheet metal, a sheet-metal casing around said upper part, forming an air-heating chamber, the masonry being provided with conduits extending from said air-heating chamber downwardly and opening vertically at the lower end of said masonry, a hearth below and concentric with the lower end of said masonry, and means for raising and lowering said hearth to open or close the lower end of said hot air conduits to any desired extent, substantially as described.

2. A cupola-furnace having its lower part built of masonry and its upper part of sheet metal, a sheet-metal casing around said upper part, forming an air-heating chamber, the masonry being provided with conduits extending from said air-heating chamber downwardly and opening vertically at the lower end of said masonry, a hearth below and concentric with the lower end of said masonry, forming an annular opening extending from the exterior of the furnace into the fire-pot, adjustable segments covering said opening upon the exterior of the furnace for regulating the admission of cold air, and means for raising and lowering said hearth to open or close the lower end of said hot-air conduits to any desired extent, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL SAHLER.

Witnesses:

GUSTAVE ALBERT OELRICHS,
J. S. WALLENBORN.