L. LOMBARDI.

ELECTRIC ARC FURNACE.

APPLICATION FILED JAN. 27, 1919.

1,346,223. **Patented July 13, 1920.**

FIG. 1

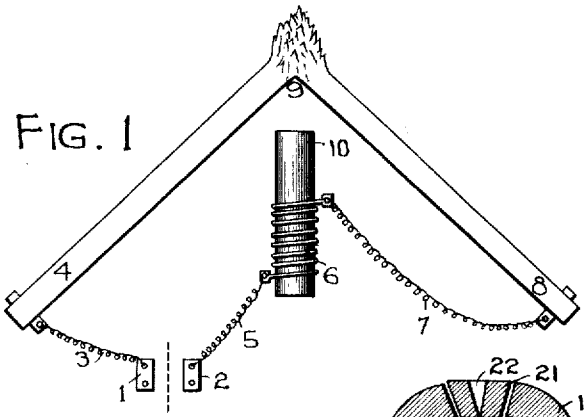


FIG. 4

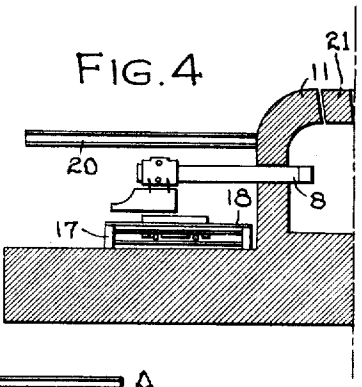


FIG. 3

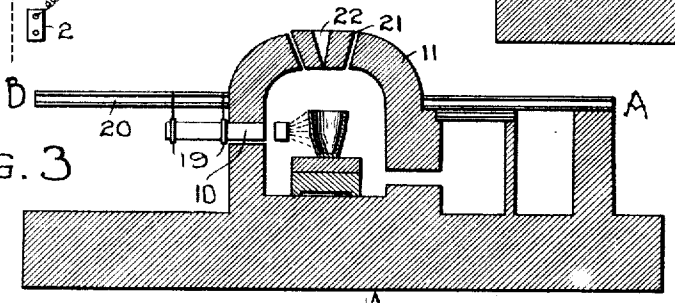
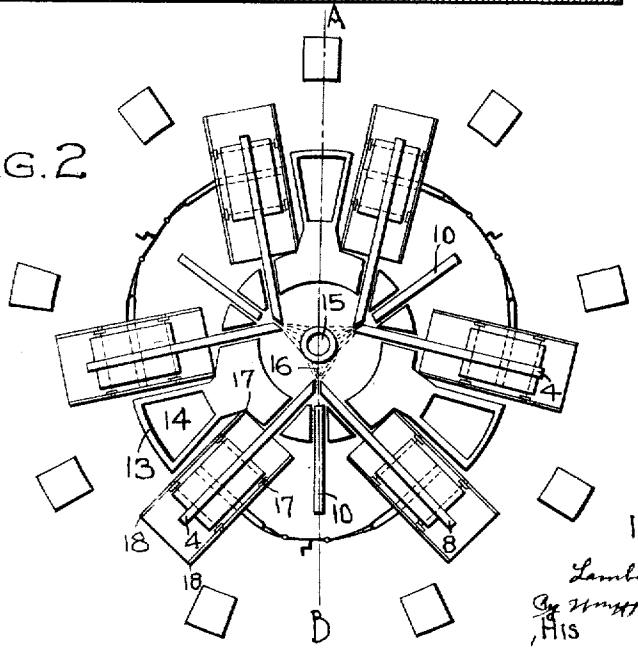


FIG. 2



INVENTOR

Lamberto Lombardi

By Wm. H. Babcock & Son

His

ATTORNEYS

UNITED STATES PATENT OFFICE.

LAMBERTO LOMBARDI, OF ROME, ITALY.

ELECTRIC-ARC FURNACE.

1,346,223. Specification of Letters Patent. Patented July 13, 1920.

Application filed January 27, 1919. Serial No. 273,339.

To all whom it may concern:

Be it known that I, LAMBERTO LOMBARDI, subject of the King of Italy, residing at Rome, Italy, have invented new and useful Improvements in Electric-Arc Furnaces, of which the following is a specification.

This invention relates to improvements in electric arc furnaces, which utilize the high temperature of the electric arc its action and effect being increased by blowing the arc against the object, the temperature of which must be elevated, such blowing of the electric arc being obtained by the formation of a magnetic field conveniently directed against said electric arc. To this end my invention consists in the construction and combination of devices hereinafter set forth and claimed. The said invention may be applied with great advantage to many heating plants and other heating means, especially where fuel is dear, and where electric power may be obtained cheaply by water power, etc., the principal applications being:

Melting furnaces, metal heating plants, precious metal furnaces, artificial or precious stone furnaces, glass works, hardening case, bakeries, apartment heating boilers, baths, large kitchens for hospitals, barracks, etc., ironsmith forges, hardening forges, chemist flames, etc.

In the accompanying drawing:

Figure 1 shows in a diagrammatic way the arrangement of the electrodes and magnet as well as the conductors of the electric power.

Fig. 2 gives an instance of the application of the blown arc in a melting furnace, and

Figs. 3 and 4 are views respectively of the arrangement of the magnet and electrodes with modifications of coöperating parts.

4 and 8 are the electrodes inclined convergingly to form with each other an angle at the apex of which is located the core of an electric magnet 10.

The conductors of the electric power from the source of energy, are fixed to the contacts 1 and 2, from the former of which the current is led by means of a phase 3—which may be also a neutral wire—to the electrode 4. From the other terminal 2, another phase through the conductor 5 is led to the coil of the electric magnet 10 and from this through conductor 7 to the electrode 8.

When the current is flowing, it excites at the same time both the electrodes 4 and 8 and the magnet 10, and while an electric arc is formed between the ends of the electrodes, a magnetic field will be extended from the magnet, blowing axially the flames of the arc as shown in Figs. 1 and 2.

As has been said, Fig. 2 shows the construction and arrangement of a melting furnace according to this invention; Figs. 3 and 4 showing details of the supports of the magnet and electrodes respectively on a larger scale.

11 is the wall of the furnace, which in the instance illustrated in Fig. 2 is shown as circular in its horizontal section, but it must be understood that the furnace may be of any desirable shape.

The furnace wall is supported by means of pillars 12 which are prolonged by walls 13 forming the chambers 14, where the molds may be placed for drying.

The electrodes 4 and 8 as well as the magnet 10, enter the furnace chamber through previously prepared holes.

In the center of the furnace chamber, and conveniently supported, is placed the melting pot 15, against which the flames 16 of the arc are blown by the magnetic field as shown by dotted lines in Fig. 2.

In the drawing I have illustrated a circular shaped furnace, and I have set three pairs of electrodes equally spaced from one another, but it is obvious that some other shape may be given to the furnace and a different number of electrodes may be arranged to the different objects. Rectangular furnaces with more than one melting pot and two or more pairs of electrodes to each pot may be preferred if convenient.

The electrodes as well as the magnets are shown as situated in a horizontal plane, but it must be understood that they may be placed into an inclined or even in a vertical position.

In Fig. 3 the magnet 10 is represented as supported by collars 19 suspended from rails 20, which support the platform on which the workmen stand, and in Fig. 4 is shown one of the electrodes as supported by trolleys 17 running on rails 18 ending at the outer wall of the furnace, the two trolleys of each pair of electrodes being connected to one another by means of any convenient connection, and each trolley being controlled in a suitable way as, for instance, by means of an endless screw.

The furnace has an upper opening closed by a movable plug 21, through which open-

ing the process of melting may be controlled, such stopper being supplied with a gas escape 22.

Having now particularly described and ascertained the nature of my invention and in what manner the same is to be performed, I declare that what I claim is:

1. The combination of the wall of an electric furnace with pairs of converging electrodes extending inward through said wall to form an electric arc between the tips of each pair, of electro-magnets having longitudinally movable cores also extending inward through said wall, one core being presented to each arc on the outer side, and electric circuit connections arranged to simultaneously energize the said electrodes and magnets, the said arcs being arranged to coöperate in heating any article between them.

2. An electric furnace having pairs of converging electrodes and a series of electro-magnets, each presenting its core to the outer side of the arc formed by one of said pairs, and tracks and suspending devices for movably supporting said magnets to move them inwardly and outwardly.

3. In combination with an electric furnace wall, devices for producing a circular series of electric arcs within the same, electrode movable toward and from said arcs, means for supporting said electrode in such motion, and tracks on which said supporting means run.

4. In combination with a pair of converging electrodes forming an arc, an electro-magnet core arranged for blowing said arc, tracks extending toward and from said arc, means traveling along said tracks and carrying said magnet core, and means for moving at least one of said electrodes toward or from the arc at will.

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

LAMBERTO LOMBARDI.

Witnesses:
PARISI LEONIDA,
ALFONSO M. MASSANIO.