F. GIOLITTI.

CEMENTATION FURNACE.

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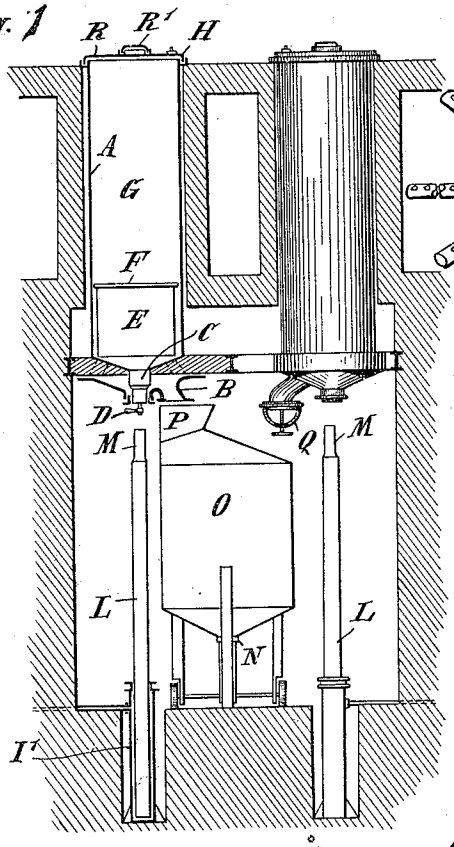
1,064,898.

Patented June 17, 1913.

Fig. 1



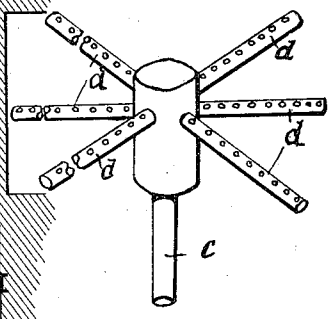


Fig 2.

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CEMENTATION-FURNACE.

1,064,898. Specification of Letters Patent. Patented June 17, 1913.

Application filed November 17, 1911. Serial No. 660,878.

To all whom it may concern:

Be it known that I, FEDERICO GIOLITTI, a subject of the King of Italy, residing at No. 105 Corso Vittorio Emanuele, Turin, Italy, have invented certain new and useful Improvements in Cementation-Furnaces, of which the following is a specification.

This invention has for its object to provide an improved furnace more especially designed for use in carrying out a process for the cementation of steel articles based on the simultaneous use of solid carbureting substances (for instance, granulated wood charcoal) and gaseous carbureting substances (for instance carbon monoxid, carbon dioxid, etc.)

The invention consists in the features hereinafter described and more particularly pointed out in the claim.

The improved furnace may be heated with any desired or convenient fuel in each case, for instance by generator gas, water gas, heavy oils, etc.

The constructional details of the improved furnace may be varied within wide limits to suit the fuel employed and the refractory materials available.

One form among a possible great variety of the improved furnace is illustrated by way of example in the accompanying drawings in which only so much is shown as is necessary for understanding the invention.

Figure 1 is a view partly in vertical section through the axes of the muffles and partly in side elevation showing the improved furnace with auxiliary apparatus in position during the cementation process. Fig. 2 is a detail on an enlarged scale.

In each muffle which is made of refractory material, there is placed a cylindrical crucible A of soft steel having an outside diameter about 10 to 20 millimeters smaller than the inside diameter of the muffle. To the bottom ring is fixed a cast iron chute B of peculiar form closed at its lower end by a valve Q.

A steel part C for the entrance of the carbureting gas extends through a stuffing box in the wall of the chute. The carbureting gas enters by the pipe D which has been screwed (during the cementation) upon the center of the part C. The latter part is connected to the hollow cast steel casing E designed to support the articles to be cemented by means of a disk F composed of steel and refractory materials.

The carbureting gas after passing through a hole formed along the axis of the part C, arrives in a small distributer (shown in Fig. 2) located in the interior of the device E. The pipe *c* of the gas distributer is in connection with the gas inlet at C, and the gas issues through holes in radial arms *d* whence it passes through a plurality of holes formed in the disk F into the cementation chamber G. The device E rests during the cementation upon a plurality of projections on the bottom to which the chute B is fixed.

The manner in which the various operations are effected will now be described, beginning with the charging of the crucible.

It is obvious that the method of charging the crucible will vary considerably according to the dimensions and shape of the articles to be cemented, so that only certain specified examples will be given here.

It is assumed that it is required to cement cylindrical toothed wheels whose greatest diameter is smaller by only 100 to 150 millimeters than the inside diameter of the crucible. First the pipe D is unscrewed; then all the parts C, E and F are raised by means of the plunger L of the hydraulic ram I', said plunger engaging with said parts by means of its truncated conical end portion M. When the plunger L has reached the end of its stroke, and the upper face of the disk F is only about 30 millimeters below the lid R of the crucible, the said lid is removed and the wheels to be cemented are stacked horizontally one above another on the disk F. As the wheels are being thus stacked, the supporting apparatus C, E, F is lowered and the charging is complete when this apparatus has reached its lowest position shown in Fig. 2.

When the articles to be cemented have been thus placed in position, the lid of the crucible is replaced, and then the bottom discharging spout N of the receptacle O is introduced through the central aperture R' (Fig. 1) in the said lid. This receptacle O is full of still hot (about 900 degrees centigrade) granulated charcoal discharged from the crucible that has served for the previous cementation.

The receptacle O may be easily moved over the muffle by hanging it on a pivoting arm by means of pulley tackle.

When the receptacle O has been placed in position as described, the valve closing the bottom aperture N is opened gradually to allow the hot granulated charcoal to run out and fill all the interstices between the articles in the crucible.

When the crucible has been filled with granulated charcoal up to about 2 to 3 centimeters below its top edge, the valve of the spout N is closed, the receptacle O is raised, the central aperture in the crucible lid is closed, the plunger L is lowered, and the pipe D is screwed to the part C. Then carbureting gas is passed gradually through the pipe D into the distributer E whence it passes into the crucible, whereupon the cementation proceeds without requiring any attention other than observing and regulating the current of gas and the temperature.

The gases passing out of the crucible through the pipe *b* on the lid, may be collected for re-use (after suitable treatment) in subsequent cementations.

After the cementation has proceeded in the manner above described for the requisite time, the current of carbureting gas is shut off, the pipe D is disconnected and the crucible is emptied by first discharging all the granulated charcoal therefrom through the valve Q into the receptacle O beneath. When this has been done, the lid R is removed, and the plunger L is raised until it engages the end cone M in the cavity of the part C. Then the hydraulic ram I′ is further operated to raise gradually the supporting device C, E, F, with the cemented articles resting thereon. After this, a workman standing on the furnace near the top opening of the muffle, has merely to take off the cemented articles as they reach the said opening, and to place them at once into the tempering receptacle also located on the furnace, if it is desired to subject them to a double tempering, otherwise he places the articles in the hot ashes. As soon as the furnace has been emptied of all the cemented articles it may be charged anew for a fresh cementing operation.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

In a cementation furnace, a muffle in which the articles to be cemented are packed in a solid carbureting medium, a hollow casing upon which the articles to be cemented are placed, means adapted to raise and lower the hollow casing, a gas distributing device within said hollow casing, and a perforated plate forming the top of said hollow casing.

In testimony whereof I affix my signature in presence of two witnesses.

FEDERICO GIOLITTI.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."