No. 716,277. Patented Dec. 16, 1902.

E. P. REICHHELM.

GAS FURNACE.

(Application filed Aug. 4, 1902.)

(No Model.)

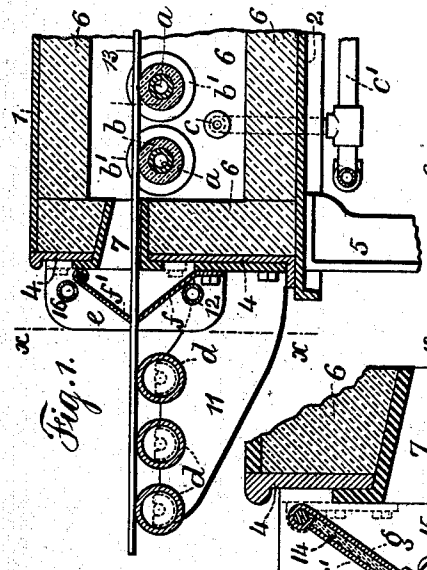


Fig. 1.

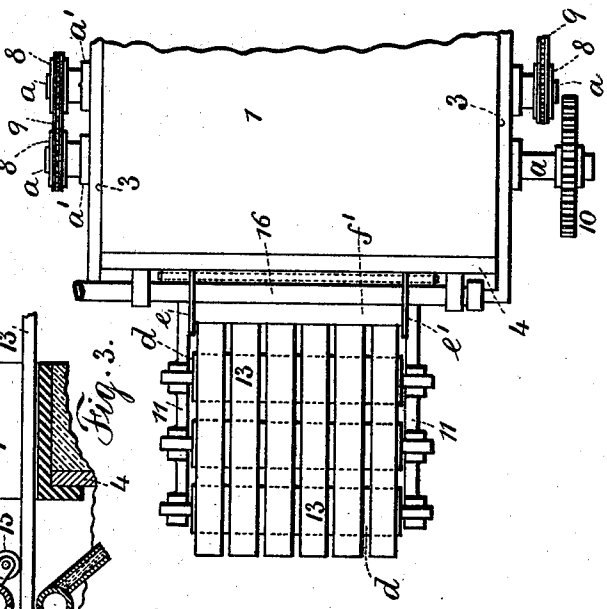


Fig. 3.

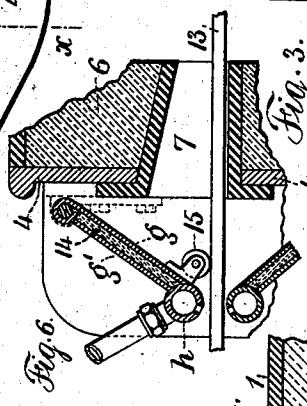


Fig. 6.

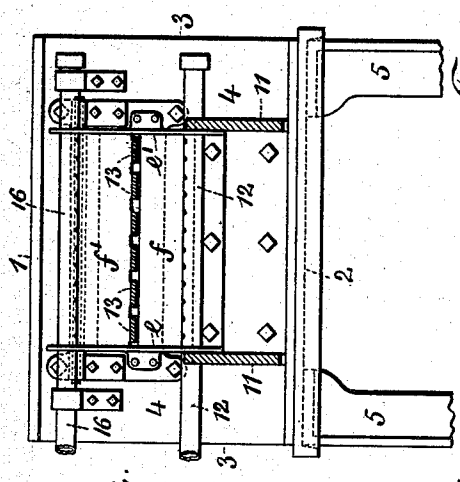


Fig. 2.

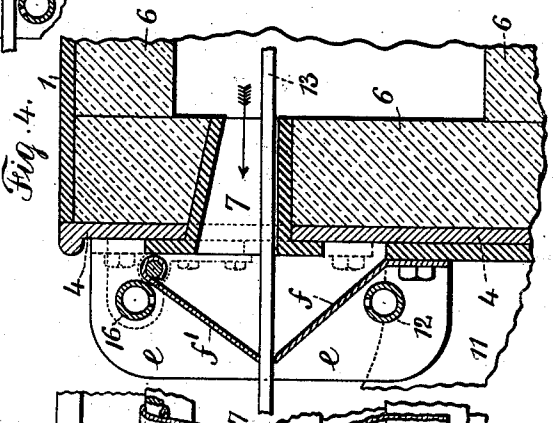


Fig. 4.

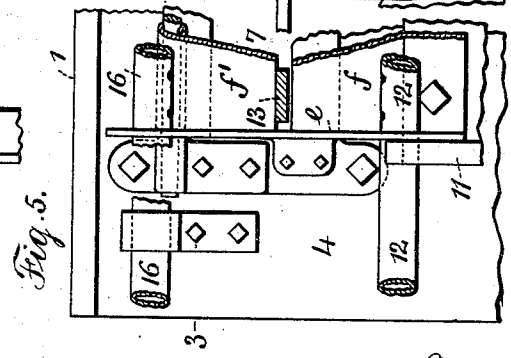


Fig. 5.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 716,277, dated December 16, 1902.

Application filed August 4, 1902. Serial No. 118,214. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. REICHHELM, a citizen of the United States, residing at Bayonne, in the county of Hudson and State of New Jersey, have invented an Improvement in Gas-Furnaces, of which the following is a specification.

My invention relates to a gas blast-furnace adapted for heating forms of metal—such as strips, bars, tubes, and similar articles—for the purpose of annealing and tempering the same in order to prepare such metal articles for drawing, stamping, or other treatment of the same in the arts.

My present invention is an improvement upon the device described and shown in Letters Patent granted to me March 12, 1901, No. 669,765. In the device of said patent the forms of metal emerged from the furnace through a discharge-throat supported by suitable rollers, and as the same came in contact with the atmosphere after leaving the interior of the gas-heated furnace oxidation of the surface of the metal was very liable to take place. This condition was exceedingly detrimental with such precious metals as silver and gold; and the object of my present invention is to overcome this defect. I have discovered that if such bars or forms of metal are treated to a water-bath as they emerge from the furnace and before they come into contact with the atmosphere and its influences this oxidation is prevented. In an application of like date herewith I have described and claimed the process of thus treating bars and other forms of metal and cooling the same, and the present application relates particularly to the apparatus for carrying out the same.

I provide at one end of the furnace and adjacent to the discharge-throat thereof deflector-plates vertically arranged and coming at the opposite ends of said discharge-throat, the same also acting in part as supports for metal tubes, finely perforated and from which water is discharged, and between these deflector-plates I employ cover-plates that extend out from the body of the furnace at one end, with their free ends so close together that there is only just room for the bars or other forms of metal emerging from the furnace to pass, and these cover-plates also act as ways to direct the water discharged from the tubes, so that the bars or forms of metal are covered entirely with the water as they emerge from the furnace and before the atmosphere can get at or have an influence upon the surfaces of said bars. These cover-plates form close union with the end of the furnace between the deflector-plates, so that the only free apertures that are left are between the plates or other forms of metal themselves and the edges of said cover-plates, and the action of the issuing jets of water from said tubes is to draw out of the furnace the gases contained therein rather than to permit the entrance of the atmosphere into the furnace, the pressure within being greater than the pressure without.

In the drawings, Figure 1 is a vertical section at one end of the furnace. Fig. 2 is an end elevation and section at $x\,x$, and Fig. 3 a plan of the same. Fig. 4 is a vertical section at one end of the furnace, showing especially features of my improvement; and Fig. 5 is an elevation of the parts shown in Fig. 4, Figs. 4 and 5 being of exaggerated size for clearness. Fig. 6 is a vertical section and elevation representing a modification.

The metal shell or case of the furnace comprises the top 1, bottom 2, sides 3, and 4 represents one end of the shell, 5 representing the legs supporting the shell at one end of the furnace, and 6 the fire-brick lining. The end of the furnace illustrated is the discharge end, in which there is a throat 7. Within the furnace there are hollow metal shafts a, supported in bearing-brackets a' and carrying rolls b, formed with annular ribs b', and there are gas-burners c, connected with gas-pipes c', the respective shafts a being connected at their ends outside of the furnace by chains 9, passing over sprockets 8, there being a wheel 10 on one shaft for connection to a power device, by which all of the shafts and sprockets are driven.

At the discharge end of the furnace there are brackets 11, carrying one or more rollers d. The parts hereinbefore described correspond with like parts shown and described in my Letters Patent aforesaid. At the dis-

charge end of the furnace and arranged at opposite ends of the throat 7 in parallel planes are deflector-plates *e e'*. Passing through these plates and supported thereby or in any suitable or desired manner and coming above and below the horizontal plane of the discharge-throat 7 are tubes 12 and 16, each having one or more rows of fine perforations and connected to a water-supply under pressure.

f f' represent cover-plates occupying a position between the deflector-plates *e e'* and extending over the throat 7 to normally close the same. The cover-plate *f* is preferably fixed to the end 4 of the metal shell and set at an angle of about forty-five degrees, extending outward and upward from the end 4. The cover-plate *f'* is flexibly connected to the end 4 of the metal shell and extends downwardly and outwardly at about an angle of forty-five degrees, the connection thereof with the end 4 being a hinge-joint.

The free ends of the plates *f* and *f'* are adapted to contact with the opposite upper and lower faces of the strips, bars, tubes, or similar forms of metal that may be passed through the furnace, the upper plate *f'* yielding, so as to provide for the differences in thickness of the metal forms and hanging by gravity, so that its free edge always rests upon such forms as they emerge from the furnace, the free edge of the cover-plate *f* being set on the same horizontal plane as the respective upper surfaces of the supporting-rolls *b* and the rollers *d*, so that said edge also contacts with the under surface of any metal forms emerging from the furnace. The space between the respective adjacent edges of emerging forms are the only spaces in evidence at the exit end of the furnace where air might enter or the gases of the furnace escape.

The apparatus employed and the method carried out thereby for heating the strips, bars, tubes, or other forms of metal for annealing, tempering, &c., is the same as set forth in my aforesaid Letters Patent.

In the operation of my improved structure and as the forms of metal 13 emerge from the furnace in a heated condition they pass between the plates *f f'* and are met by an upward stream of water from the pipe 12 and a downward stream of water from the pipe 16, emerging under force from the fine perforations therein, so that for an appreciable distance said forms of metal are completely enveloped with water and the steam generated therefrom by the heat of said forms of metal. The action of the water and steam is to keep the atmosphere away from the forms of metal and to draw out of the furnace the heated gases therein, which are presumably under greater pressure than the atmosphere without, and to so cool the forms of metal before they are subjected to atmospheric influence. This has the effect of preventing oxidation and of maintaining the polished surfaces of the forms of metal in as bright and perfect a condition as when introduced into the furnace at the opposite end for heating, tempering, and annealing.

In Fig. 6, illustrating a form of my invention, I have shown the hinged cover-plate as made of two metal parts *g g'* with an intervening layer of asbestos 14, with a roller 15 adapted to run upon the surface of the emerging forms of metal and having bearings secured to the plate *g*. The water-tube *h* is secured to the lower free edges of the plates *g g'* in close proximity to the work, where the streams of water issuing with force can be most effectually employed.

I do not wish herein to be limited to the precise or exact structure illustrated, as it may be possible to depart from the same to an appreciable extent and still effect the same result.

I claim as my invention—

1. In a gas or other furnace, the combination with a series of conveyers and a discharge-throat, of means extending around the discharge-throat substantially excluding the entrance of the atmosphere to the furnace and substantially inclosing the forms of metal emerging therefrom, and means adjacent thereto for discharging sprays of water upon and for cooling the emerging forms of metal, substantially as set forth.

2. In a gas or other furnace, the combination with a series of conveyers and a discharge-throat, of means arranged at the respective ends of the discharge-throat of the furnace, and means between the same and extending over the entire discharge-throat and yielding for the passage of the forms of metal as emerging from the furnace between the same, and perforated tubes located adjacent to the latter means and discharging sprays of water that entirely surround the emerging forms of metal, substantially as set forth.

3. In a gas or other furnace, the combination with a series of conveyers and a discharge-throat, of deflector-plates arranged parallel and in vertical planes at the opposite ends of the discharge-throat, cover-plates arranged between said deflector-plates and substantially closing the discharge-orifice but yielding to permit the forms of metal emerging from the furnace to pass between the same, and tubes having fine perforations for the discharge of water under pressure arranged above and below the discharge-throat and said cover-plates, substantially as set forth.

4. In a gas or other furnace, the combination with a series of conveyers and a discharge-throat, of deflector-plates *e e'* arranged vertically and parallel to one another at the opposite ends of the discharge-throat, a fixed cover-plate *f* secured to the end shell of the furnace and extending upwardly and outwardly at an angle of about forty-five degrees, and between the deflector-plates, a cover-plate *f'* also between the deflector-plates and hinged at its upper edge to the end shell of the furnace

and extending downwardly and outwardly and hanging by gravity upon the emerging forms of metal and tubes 12 and 16 having fine perforations therein for water under pressure arranged above and below the discharge-throat and adjacent to the points of connection of the respective cover-plates to the end shell of the furnace, whereby the water discharged from said tubes is spread over the surfaces of said cover-plates and is ejected with force against the emerging forms of metal and covers the surfaces thereof for the purposes of cooling the same, before they come into contact with the atmosphere.

5. In a gas or other furnace, the combination with a series of conveyers and a discharge-throat, of deflector-plates arranged parallel and in vertical planes at the opposite ends of the discharge-throat, cover-plates arranged between said deflector-plates and substantially closing the discharge-orifice but yielding to permit the forms of metal emerging from the furnace to pass between the same, and tubes having fine perforations coacting with said cover-plates for the discharge of water under pressure directly upon and around the heated forms of metal, substantially as set forth.

Signed my me this 29th day of July, 1902.

EDWARD P. REICHHELM.

Witnesses:
GEO. T. PINCKNEY,
BERTHA M. ALLEN.