Aug. 16, 1927. 1,639,243

J. WEINTZ

ROTARY HEATING FURNACE

Filed April 10, 1924 2 Sheets-Sheet 1

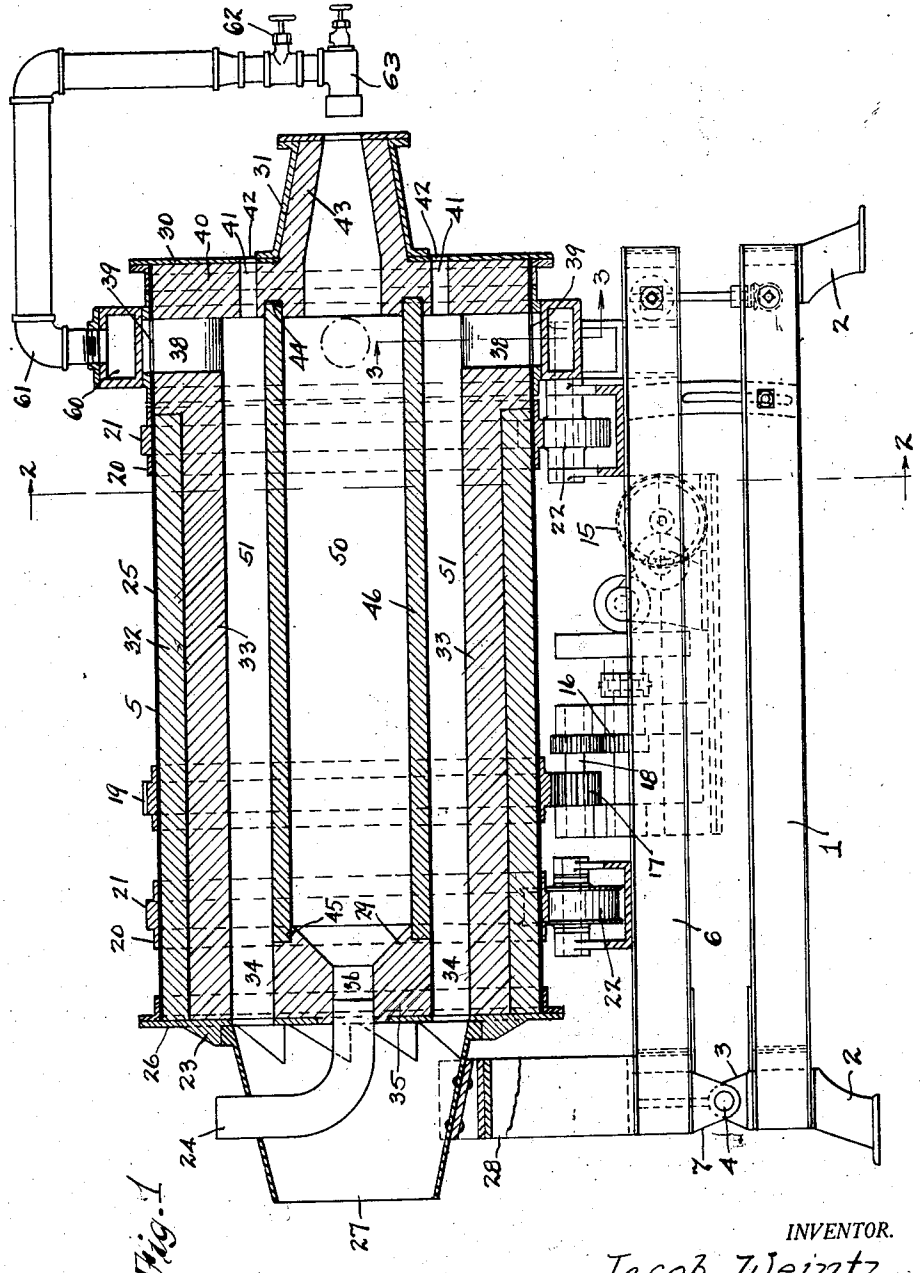


Fig. 1

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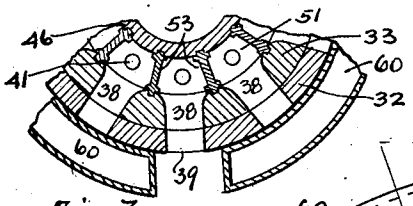


Fig. 3

Fig. 2

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UNITED STATES PATENT OFFICE.

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ROTARY HEATING FURNACE.

Application filed April 10, 1924. Serial No. 705,517.

The present invention relates to a heating furnace and more particularly to a horizontal type of rotary furnace in which metal articles may be reheated for working or tempering. The present furnace is arranged so that the articles may be fed therethrough by gravity.

One object of the invention is to provide a furnace in which the articles or material to be treated shall pass through a chamber separate from that which carries the heating gases. Another object is to provide a construction whereby the articles may be passed through the hot zone above the chamber carrying the heating products.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a vertical longitudinal section through the furnace but showing the base in elevation, Fig. 2 is a transverse section on the line 2—2 of Fig. 1, and Fig. 3 is a section on the line 3—3 of Fig. 1.

The present heating furnace comprises a suitable base or stationary frame 1 having legs 2, the base having upstanding brackets 3 at one end in which is mounted a shaft or bearing 4. The heating cylinder 5 is carried by a framework 6 which has at one end depending apertured brackets 7 pivotally mounted on the shaft 4. At the other end the framework 6 is provided with two tapped supporting lugs 8 which receive the threaded portion of two shafts 9 which are journaled in the base and which are provided at their lower ends with bevel gears 10 in mesh with bevel gears 11 carried on a cross shaft 12 in the base, this shaft 12 having squared ends 13 to receive a crank so that the shaft 9 may be turned to raise and lower the cylinder frame 6.

Mounted on the pivotal framework 6 is the driving mechanism comprising a source of power such as a motor 15, connected through gearing 16 to a spur gear 17 carried on a longitudinal shaft 18, this gear being in mesh with a gear 19 encircling and attached to the cylinder 5. The cylinder 5 is provided with two encircling rails 20, one placed near each end comprising bands having a raised central portion 21. Mounted on the base in suitable bearing brackets are two sets of supporting rollers 22, these rollers having two edge flanges and a depressed central portion adapted to receive the portion 21 of the rail. The cylinder is revolved on these two sets of rollers by the spur gear 17 and the encircling gear 19.

The heating cylinder consists of an outer metallic shell 25 having a head 26 formed with an annular shoulder 23. An inlet funnel 27 is mounted on a supporting bracket 28 carried by the framework and this funnel has a rotating fit with the shoulder 23 and carries an exhaust gas flue or pipe 24. At the other end the shell is provided with a fixed head 30, having a hollow burner extension 31. For the major portion of its length, the shell has an interior lining 32 of some suitable refractory material and a second lining 33 of refractory material is also provided which is formed with a head portion 29 at the inlet end, the head being provided with a series of openings 34 and a centrally placed bushing 35 which has an outlet aperture 36 connecting with an exhaust gas pipe 24 carried by the stationary head.

This lining 33 at the other end has a thickened portion fitting around the end of the first lining 32 and formed with a series of pockets or openings 38 which are aligned with similar openings 39 in the shell itself. The lining has an integral head 40, with apertures 41 therein aligned with apertures 42 in the fixed head 30, the lining having a hollow extension 43 which lines the burner extension 31. This head portion has an annular groove 44 and the bushing 35 of the lining has a portion 45 of reduced character.

To form an interior chamber, a cylinder 46 of refractory material is mounted within the lining 33, one end of the cylinder being received in the annular groove 44, and the other end fitting on the portion 45 of reduced diameter. This cylinder 46 divides the interior into a central cylindrical combustion chamber 50 connecting at one end with the burner extension and at the other with the exhaust gas flue, and an annular chamber 51 surrounding the cylinder 46, which space is divided into a series of longitudinal chambers by means of a series of metal beams 53 of suitable heat resistant alloy. These beams are of a modified I-beam shape having an extension 54 at both top and bottom of the I which is inserted in

suitable longitudinal grooves in the cylinder 46 and the lining 33 so that the beams are removable. These beams extend the full length of the interior and fit against the head 40, the beams extending through slots in the head portion 29 at the inlet end of the device.

As best shown in Fig. 3, near the burner end of the chamber, there is mounted a hollow air heating ring 60, fitting snugly around the shell and closing the openings 39, except the one at the bottom, the ring being divided at this point to allow the articles being treated to drop out. The ring has an air inlet opening 70 at the side and is connected at the top to an air pipe 61 carrying a valve 62 and the burner nozzle 63 at its lower end.

In operation the articles to be heated are fed into the funnel and slide by gravity into the chambers formed by the I-beams. The shell is revolved and is given the necessary inclination to feed the articles through the chambers by gravity at the correct speed. The articles finally drop out through the pockets at the end of each chamber as they register with the bottom opening in the air heating ring 60. As the shell and lining rotates, the longitudinal chambers with the articles to be heated come up to the top. The fuel is burned in the central chamber and the refractory cylinder allows the heat to pass readily to the heating chambers but naturally the chambers at the top get more heat than those underneath and as the device rotates, are thus heated evenly and to the highest temperature possible. The refractory cylinder, however, confines the combustion within the inner chamber and prevents the articles coming directly into contact with the gases during combustion.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a rotary heating furnace, an inclined rotary shell having a refractory lining, an inner cylinder of refractory material forming a central combustion chamber and an annular heating chamber, a series of beams between said inner cylinder and said lining and dividing said annular chamber into a series of longitudinal chambers, a pivotally mounted framework for said shell and power means on said framework for rotating said shell.

2. In a rotary heating furnace, an inclined rotary shell having a refractory lining, an inner cylinder of refractory material forming a central combustion chamber and an annular heating chamber, a series of beams between said inner cylinder and said lining and dividing said annular chamber into a series of longitudinal chambers, a pivotally mounted framework for said shell, power means on said framework for rotating said shell, a base for said framework, a pivotal support at one end of said base for said framework and means on said base for moving said framework about said pivotal support to adjust the inclination of said shell.

Signed by me, this 9th day of March, 1924.

JACOB WEINTZ.