July 21, 1925. 1,546,703

T. F. BAILY ET AL

CONTINUOUS FURNACE

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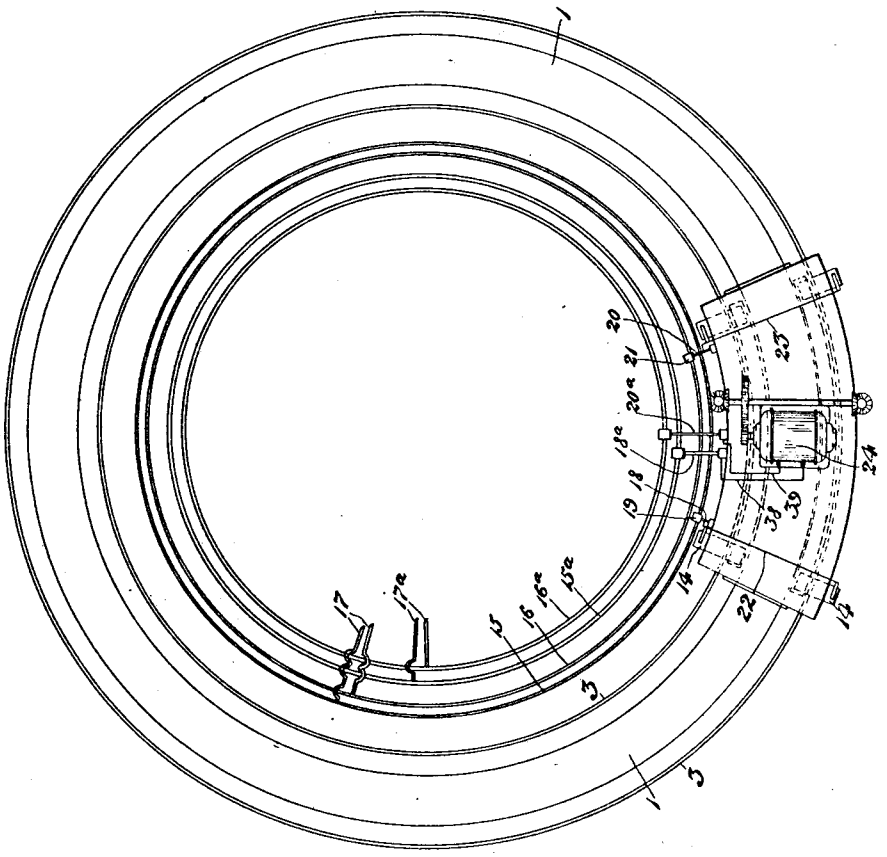


Fig. 1.

Inventors

T.F.Baily and
F.T Cope.

By

Frease and Bond

Attorneys

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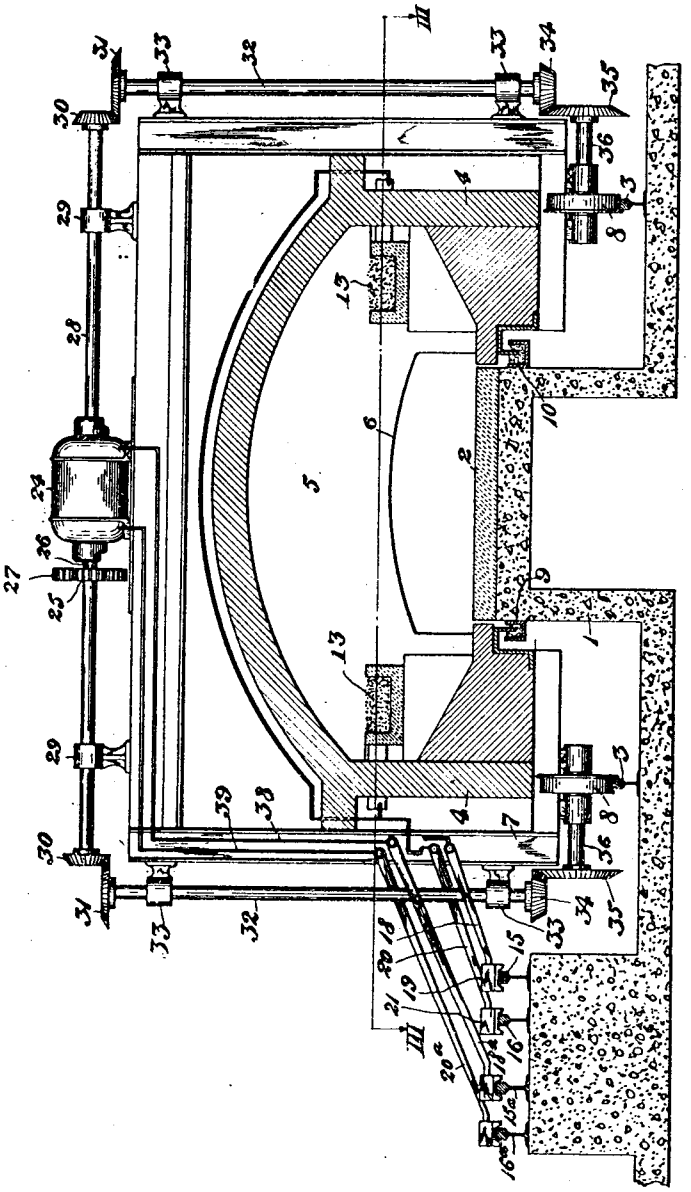


Fig. 2.

Inventors

T. F. Baily and
F. T. Cope.

By Freese and Bond
Attorneys

July 21, 1925. 1,546,703

T. F. BAILY ET AL.

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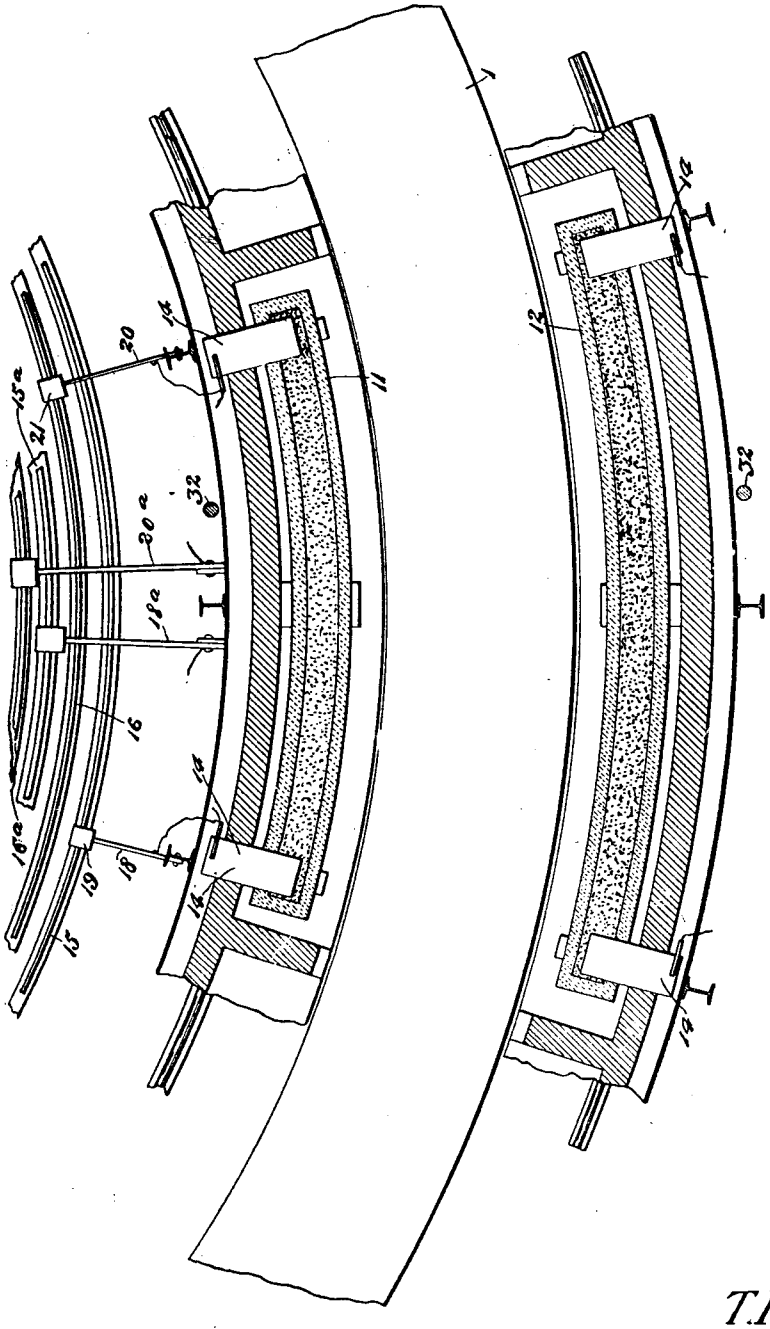


Fig. 3.

Inventors
T.F.Baily
F.T.Cope.

By Frease and Bond
Attorneys

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T. F. BAILY ET AL

CONTINUOUS FURNACE

Filed Sept. 9, 1921 4 Sheets-Sheet 4

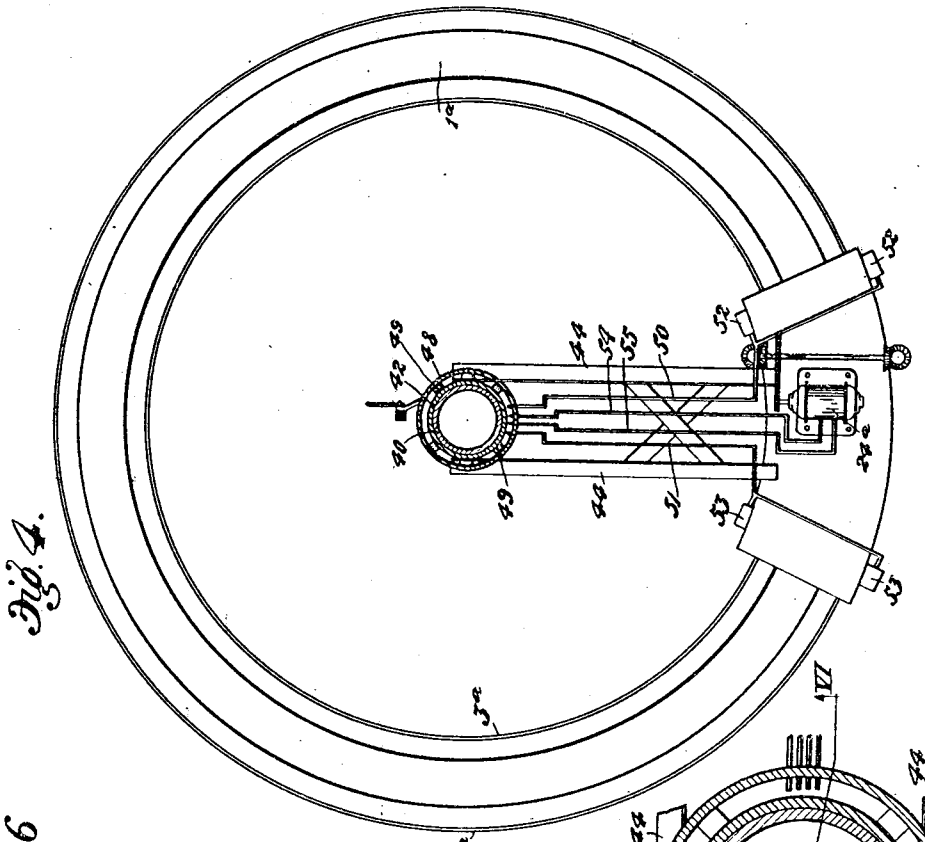


Fig. 4.

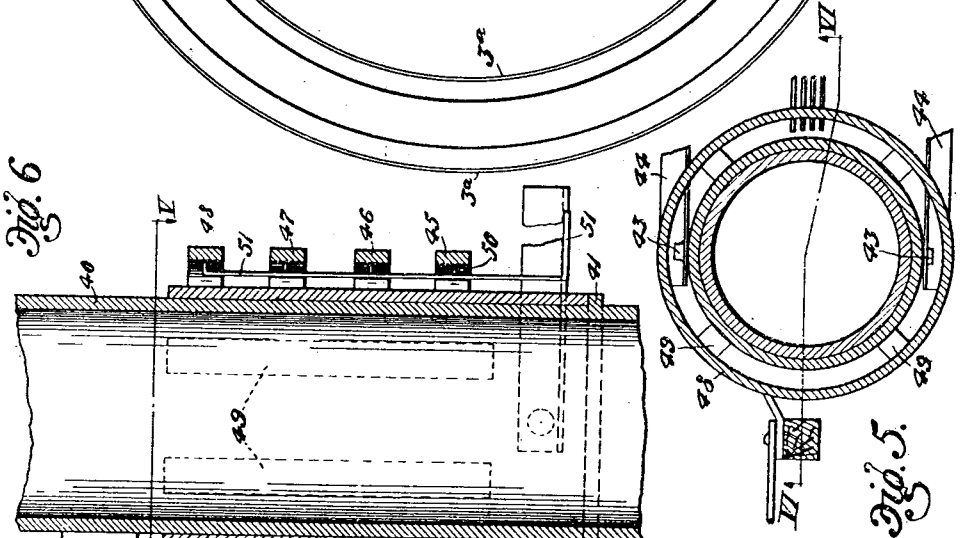


Fig. 5.

Fig. 6.

Inventors
T. F. Baily and
F. T. Cope.
By Frease and Bond.
Attorneys

Patented July 21, 1925. 1,546,703

UNITED STATES PATENT OFFICE.

THADDEUS F. BAILY AND FRANK T. COPE, OF ALLIANCE, OHIO, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE ELECTRIC FURNACE COMPANY, OF SALEM, OHIO, A CORPORATION OF OHIO (INCORPORATED 1923.)

CONTINUOUS FURNACE.

Application filed September 9, 1921. Serial No. 499,360.

To all whom it may concern:

Be it known that we, THADDEUS F. BAILY and FRANK T. COPE, citizens of the United States, both residing at Alliance, in the county of Stark and State of Ohio, have invented a new and useful Continuous Furnace, of which the following is a specification.

This invention relates to continuous furnaces and more particularly to a furnace designed to be moved over a stationary table or platform.

The objects of the invention are to provide a furnace including a stationary table or platform upon which the articles to be heated are placed, the furnace being arranged to be moved slowly over said table, the articles being placed upon the platform in advance of the furnace and removed therefrom after the furnace has passed, the movement of the furnace being sufficiently slow to bring the articles upon the platform up to the desired temperature.

The above and other objects may be attained by providing a circular platform, a rail being provided around each side of said platform, the furnace being mounted upon said rails and provided with suitable motive power to propel the same slowly around the platform.

Although the furnace is illustrated in the drawings as arranged to travel upon a circular platform, it will be understood that the invention may be carried out without any material change in the construction of the furnace, by providing a straight platform, the direction of movement of the furnace being changed at each end of the platform; and while the furnace illustrated is an electrically heated furnace, it will be understood that any form of furnace may be used.

The invention thus set forth in general terms is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the furnace and platform embodying the invention;

Fig. 2, a transverse, sectional view through the furnace and platform, upon an enlarged scale;

Fig. 3, a section upon the line 3—3, Fig. 2 upon a slightly smaller scale;

Fig. 4, a view similar to Fig. 1, showing a modified form of the furnace;

Fig. 5, a section on the line 5—5, Fig. 6; and

Fig. 6, a section on the line 6—6, Fig. 5.

Similar numerals of reference indicate corresponding parts throughout the several figures of the drawings.

The circular platform which is indicated at 1, is of suitable height to serve as the hearth of the furnace, and may be covered with fire brick or the like, as shown at 2. A circular rail 3 is provided upon each side of the platform, upon which the furnace is mounted to travel in a circular path around the platform.

The side walls 4 of the furnace are curved to conform to the curvature of the platform 1, and the end walls 5 are provided with the openings 6 of sufficient size to receive the articles placed upon the platform.

A structural steel frame 7 is provided around the furnace, the entire structure being supported upon the flanged wheels 8, which are mounted upon the rails 3. A sand seal is preferably provided at 9 and 10 upon each side of the platform, between the platform and the movable furnace for the purpose of preventing heat from escaping from the furnace.

The furnace illustrated is of the electrically heated type, and is provided upon each side with a resistor trough, these resistor troughs being preferably curved to conform with the side walls of the furnace, being designated by the numerals 11 and 12, each trough being filled with a resistance body, consisting of a carbonaceous material in granular form, such as crushed coke, charcoal or the like, which is designated at 13 in the drawings.

Embedded in the resistance material, preferably near each end of each trough, as best shown in Fig. 3, is an electrode 14, which extends through the adjacent wall of the furnace.

A pair of circular conductor rails 15 and 16, concentric with the circular platform 1,

are located adjacent to the platform, preferably upon the inner side thereof and are electrically connected to a suitable source of electric energy as by the wires shown at 17 in Fig. 1.

A collector arm 18 is pivotally connected at one end to the frame of the furnace, the collector shoe 19 thereof being held by gravity in contact with the conductor rail 15, a similar collector arm 20 being provided with a shoe 21 which engages the conductor rail 16.

The collector arm 18 is connected by means of the conductor wire 22 with the electrodes at one end of each trough 11 and 12 and the collector arm 20 is connected by means of a similar conductor wire 23 with the electrodes at the other end of each trough, thus providing a circuit through each of the resistor troughs.

A motor 24 is carried by the frame 7 preferably being supported above the furnace as shown in the drawings, a pinion 25 being mounted upon the motor shaft 26 and meshing with a gear 27 mounted upon the shaft 28, which is carried in suitable bearings 29 supported from the frame.

A bevel pinion 30 is fixed upon each end of the shaft 28 and meshes with a bevel gear 31 mounted upon the upper end of the adjacent, vertical shaft 32, said vertical shafts being journaled in bearings 33 supported upon the frame 7. A bevel pinion 34 is fixed upon the lower end of each of said vertical shafts and meshes with a bevel gear 35 mounted upon the axle 36 of the adjacent wheel 8.

The motor 24 is connected to the electric circuit by means of the conductor wires 38 and 39 which are connected to the collector arms 18^a and 20^a respectively.

The collector arms 18^a and 20^a are provided with suitable collector shoes which engage the circular conductor rails 15^a and 16^a respectively, these conductor rails being connected to any suitable source of electric energy as by the wires 17^a.

Electric energy is thus furnished to the motor which operates the traction wheels of the furnace and to the resistor elements which heat the furnace, from the sources of electric energy through the conductor rails 15—16 and 15^a—16^a, the resistor troughs and motor being in circuit with said conductor rails at any point around the circular platform.

In operating the furnace, the current is caused to flow through the conductor rails 15—16 and 15^a—16^a, and through the collector shoes and arms the current is carried to the resistor troughs of the furnace, heating the interior of the furnace to the desired temperature, while at the same time the motor 24 is operated and through the gearing above described, the traction wheels 8 are rotated, moving the furnace slowly around the circular platform 1 upon the rails 3. The articles to be heated are placed upon the platform in advance of the moving furnace and removed therefrom after the furnace has passed, the movement of the furnace being sufficiently slow to bring the articles up to the desired temperature.

In the form of the invention shown in Figs. 4 to 6 inclusive, the circular platform 1^a, the rails 3^a and the movable furnace may be of the same construction as shown and described in Figs. 1 to 3 inclusive.

In this form of the invention, a vertical column 40 is mounted concentric to the circular platform 1^a and is provided midway with an annular flange or shoulder 41, a sleeve 42 being rotatably mounted upon the column above said shoulder. This sleeve is provided with a pair of diametrically opposite trunnions 43 to which are pivotally connected the inner extremities of the angle irons 44 which extend to the roof of the movable furnace.

A series of spaced rings 45, 46, 47 and 48 are located around the sleeve 42, being spaced therefrom by the insulated bars 49. Wires 50 and 51 are connected to the electrodes 52 and 53 respectively of the resistor troughs, the wire 50 being connected to the ring 45, and the wire 51 being connected to the ring 48.

The wires 54 and 55 are connected to the rings 46 and 47 respectively and lead to the motor 24^a. It will be noted that all of the wires 50, 51, 54 and 55 extend upwardly between the sleeve 42 and the rings 45, 46, 47 and 48, being connected to the inner surfaces of said rings, thus leaving the outer surfaces of the rings free of any obstruction.

A bracket 56 is supported upon the column above the sleeve 42 and the insulated bar 57 depends from said bracket parallel to the sleeve and carries the projections 58, 59, 60 and 61, which engage the rings 45, 46, 47 and 48 respectively.

The shoes 58 and 61 are connected by means of the wires 62 with a suitable source of electric energy for supplying the resistor troughs and the shoes 59 and 60 are connected by means of the wires 63 with a suitable source of electric energy for supplying the motor.

As the movable furnace is thus carried around the circular platform, the sleeve 42 will be rotated upon the column 40 by means of the angle bars 44, the rings 45, 46, 47 and 48 being held in contact with the shoes 58, 59, 60 and 61 respectively, the motor and resistor troughs always being in circuit with the supply lines.

In the usual form of continuous furnace, the furnace proper is stationary and the articles to be heated are carried through the heating chamber of the furnace upon a

train of cars which would have a length approximating that of the circular platform used in the present case. Mechanism is provided for moving the train of cars through the furnace and the articles carried upon the cars are subject to shocks of varying intensity, which in some cases are particularly undesirable, as the articles being heated are sometimes enlarged thereby. In a furnace of the type shown, the articles are not disturbed while being heated, thus obviating this difficulty.

We claim:—

1. A continuous furnace including a stationary platform upon which the articles to be heated are placed, and a movable furnace mounted over said platform and arranged to be moved along the platform and provided at opposite ends with openings to receive the articles upon the platform.

2. A continuous furnace including a stationary platform upon which the articles to be heated are placed, and a movable furnace mounted over the platform and arranged to be moved along the platform and provided at opposite ends with openings to receive the articles upon the platform, said platform extending into the heating chamber of the furnace.

3. A continuous furnace including a platform, a rail mounted upon each side of the platform, a movable furnace mounted over the platform and provided at opposite ends with openings to receive the articles upon the platform, wheels upon said furnace engaging said rails and means for propelling the furnace upon the rails.

4. A continuous furnace including a stationary platform upon which articles to be heated are placed, a movable furnace mounted over the platform and arranged to be moved along the platform and provided at opposite ends with openings to receive the articles upon the platform, a resistance element in the furnace, a fixed conductor and a movable connector connecting the resistance element with the conductor and an electric circuit in which the conductor, connector and resistance element are located.

5. A continuous furnace including a stationary platform upon which articles to be heated are placed, a movable furnace mounted over the platform and provided at opposite ends with openings to receive the articles upon the platform, a motor for propelling the furnace, a fixed conductor and a movable connector connecting the motor with the conductor and an electric circuit in which the conductor, connector and motor are located.

6. A continuous furnace including a stationary platform upon which articles to be heated are placed, a movable furnace mounted over the platform and arranged to be moved along the platform and provided at opposite ends with openings to receive the articles upon the platform, resistance elements in the furnace, a fixed conductor and a movable connector connecting the resistance elements with the conductor and an electric circuit in which the conductor, connector and resistance elements are located.

7. A continuous furnace including a stationary platform upon which articles to be heated are placed, a movable furnace mounted over the platform and provided at opposite ends with openings to receive the articles upon the platform, a motor for propelling the furnace, resistance elements within the furnace, a pair of fixed conductors, a movable connector electrically connecting the motor with one of said conductors and a movable connector electrically connecting the resistance elements with the other conductor.

8. A continuous furnace including a platform, a movable furnace mounted over the platform and provided at opposite ends with openings to receive the articles upon the platform, a motor upon the furnace, conductor rails located beside the platform, collector arms electrically connected to the motor and engaging the conductor rails and means operated by the motor for propelling the furnace along the platform.

9. A continuous furnace including a platform, a movable furnace mounted over said platform and provided at opposite ends with openings to receive the articles upon the platform, means for propelling said furnace along the platform, an electric resistance element within the movable furnace, conductor rails located beside the platform, and collector arms electrically connected to the resistance element and engaging said conductors.

10. A continuous furnace including a platform, a movable furnace mounted over the platform and provided at opposite ends with openings to receive the articles upon the platform, means for propelling the furnace along a platform, a motor carried by the furnace and operatively connected to said propelling means, resistance elements within the furnace, conductor rails located beside the platform and collector arms carried by the furnace and electrically connected to the motor and to the resistance elements and engaging said conductor rails.

11. A continuous furnace including a circular platform upon which the articles to be heated are placed, a movable furnace located over said platform and means for moving the furnace around the platform.

12. A continuous furnace including a circular platform upon which the articles to be heated are placed, a movable furnace mounted over said platform, a motor upon the furnace for propelling the same along the platform, circular conductor rails lo-

cated adjacent to the platform, and collector arms electrically connected to the motor and engaging said conductor rails.

13. A continuous furnace including a circular platform upon which the articles to be heated are placed, a movable furnace mounted over the platform and arranged to be propelled around the platform, resistor elements within the furnace, circular conductor rails concentric with the platform and collector arms connected with the resistor elements and engaging said conductor rails.

14. A continuous furnace including a circular platform arranged to hold articles to be heated, a circular rail upon each side of the platform and concentric therewith, a movable furnace provided with traction wheels mounted upon said rails, a motor carried upon said movable furnace and operatively connected to the traction wheels, resistor troughs within the movable furnace, circular conductor rails located adjacent to the platform and concentric therewith, and collector arms pivotally mounted upon the movable furnace and electrically connected to the motor and to the resistor troughs and engaging said conductor rails.

15. In combination with a stationary hearth upon which articles to be heated are placed, a movable furnace and means for continuously moving the furnace along the hearth and over successive groups of the articles.

16. A continuous furnace including a circular hearth upon which the articles to be heated are placed, a movable furnace located over said hearth, a motor upon the movable furnace for propelling the same along the hearth, a fixed conductor and a movable connector electrically connecting the motor with the conductor.

In testimony that we claim the above, we have hereunto subscribed our names.

THADDEUS F. BAILY.
FRANK T. COPE.