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G. BLUEMEL

AUTOMATIC ROTARY HEATING FURNACE

Filed Aug. 22, 1921

2 Sheets-Sheet 1

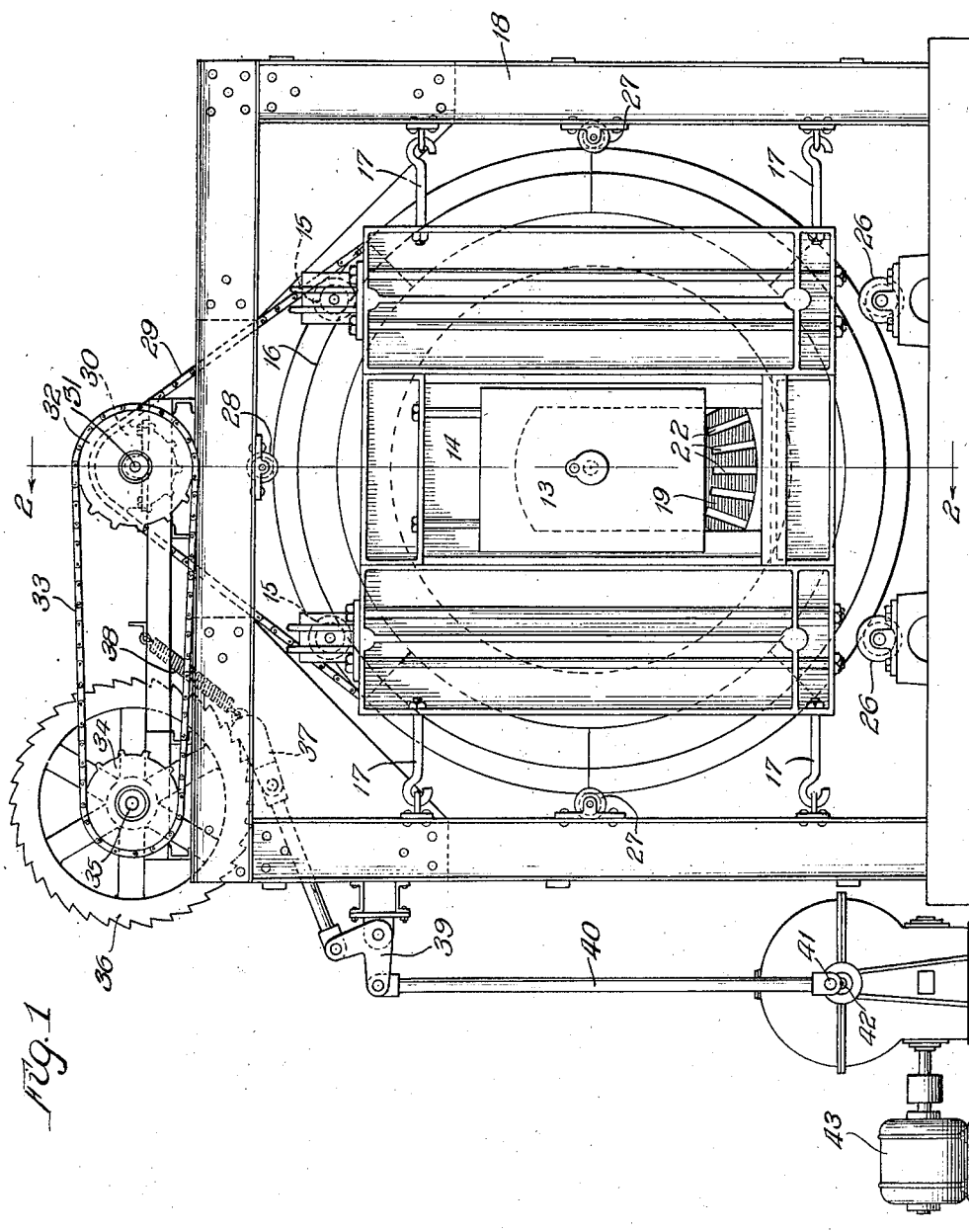


Fig. 1

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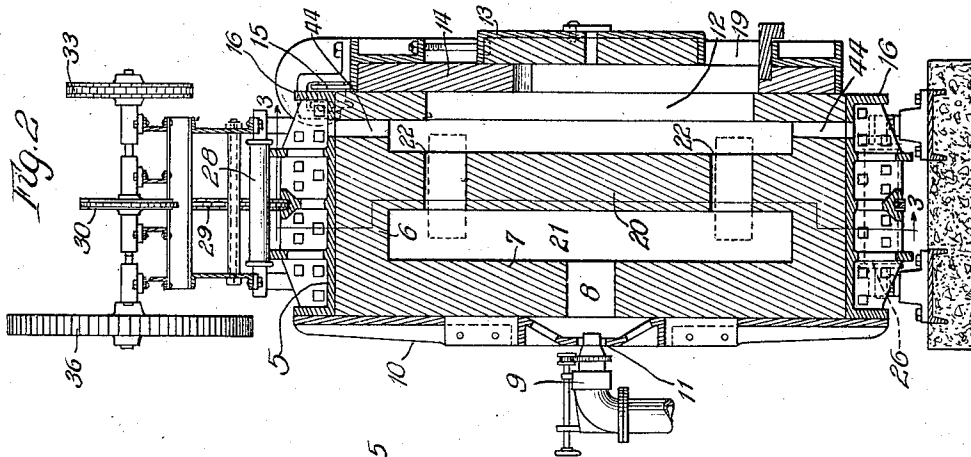
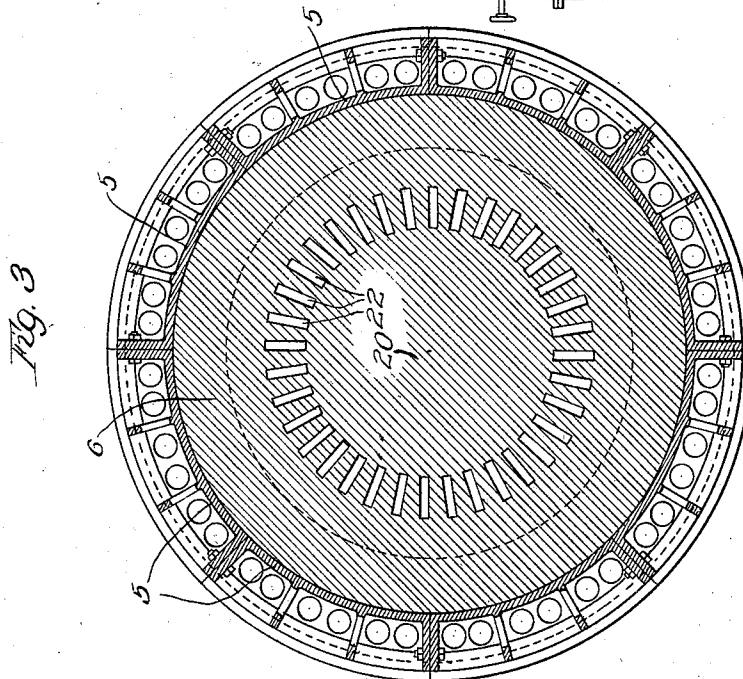
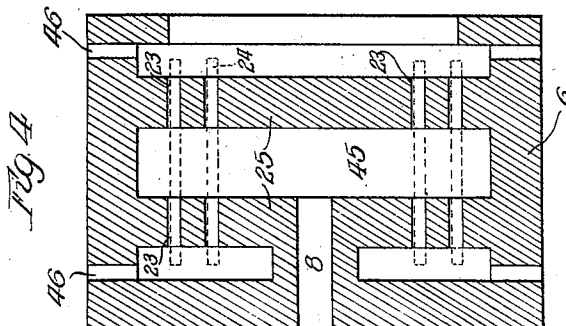
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UNITED STATES PATENT OFFICE.

GUSTAVE BLUEMEL, OF TOLEDO, OHIO.

AUTOMATIC ROTARY HEATING FURNACE.

Application filed August 22, 1921. Serial No. 494,203.

To all whom it may concern:

Be it known that I, GUSTAVE BLUEMEL, a citizen of German Austria, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Automatic Rotary Heating Furnaces, of which the following is a specification.

This invention has for its object to provide a rotary heating furnace of compact and substantial construction which can be easily operated by one man under satisfactory working conditions and in which the brickwork is easily accessible for repairs so that the furnace can be easily maintained at little expense for upkeep.

A further object of the invention is to provide a maximum radiating surface in a compact rotary furnace and to cause the furnace gases to travel along the surface of the material to be heated in a manner to secure the highest efficiency in the treatment of a large quantity of material.

The invention has other objects in view which will appear hereafter in the detail description of a selected embodiment thereof as shown in the accompanying drawings, in which—

Fig. 1 is a front elevation of the furnace;
Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view showing another brickwork arrangement.

Referring to the drawings, the outer casing of the furnace is made up of a plurality of ribbed sections 5 bolted together and varying in size and in number as may be desirable for different furnaces.

The inner wall of the casing is lined with firebrick at 6 and then brickwork is extended across one end at 7 with a centrally disposed opening 8 for the burner 9 which is suitably supported adjacent the casing. The bricked end of the furnace is covered or supported with a suitable cover plate or frame 10 provided with an opening 11 to register with the opening 8 and accommodate the burner. Any burner suitable for the purpose may be employed but only one burner is necessary and this may be of the single spray type or of a cluster type as will be found more desirable in different classes of work. The other

end of the furnace, the front end, has a large opening 12 which is covered by a door consisting of a metal frame-work 13 lined with fire brick 14. This door is provided with rollers 15 which ride on the circular outer edge 16 of the casing and the door is held rigidly in place covering the open end of the furnace by rods 17 connected therewith and with the main frame 18. The door is thus hung flush against the front of the furnace and it is provided with a small opening 19 through which the material to be heated can be inserted into or withdrawn from the furnace.

A solid partition wall 20 of fire brick is centrally disposed within the heating chamber 21 and it is provided with a number of circularly disposed openings extending longitudinally of the furnace and of a size and shape adapted to receive the material to be heated. In Figs. 1 to 3 the furnace is shown with openings 22 adapted to receive and hold slabs and material of similar shape, and it will be readily understood that these openings may be varied in shape and size to accommodate material of other shapes and sizes.

In Fig. 4 I have shown how the brickwork can be constructed to support two concentric circles of round openings 23 to accommodate round stock 24 and if the stock is of sufficient length to require it there may be two partition walls 25, 25 instead of the single partition wall 20 previously described.

The casing is supported at the bottom by rolls 26 mounted on the main frame, and is held in position by side rolls 27 and a top roll 28. A sprocket chain 29 is trained around the furnace and a sprocket wheel 30 mounted on a drive shaft 31 journaled in bearings on the main frame. This drive shaft also carries a sprocket wheel 32 and a sprocket chain 33 is trained over this sprocket wheel and over a sprocket wheel 34 on the shaft 35 which carries the ratchet wheel 36. A ratchet pawl 37 is held by a spring 38 in engagement with the ratchet wheel and is carried by a bell crank 39 which is connected by a rod 40 with an eccentric pin 41 on the shaft 42 which is driven by any suitable connections with a motor 43 or other source of power. It is apparent that means must be provided to effect a reduction from motor speed to furnace speed which, in the embodiment illustrated, is

about one revolution in fifteen minutes. This reduction may be accomplished by any suitable means whereby a proper rotation of the furnace casing is produced.

5 The furnace gases travel through the openings in the partition of Figs. 1 to 3 and thence escape through the circularly disposed flues 44; and in Fig. 4 the furnace gases travel from the centrally disposed
10 heating chamber 45 in opposite directions through the openings 23 and escape through the circularly disposed flues 46.

The operation of the furnace will be apparent to those skilled in the art and it will
15 be at once observed that the furnace can be operated by one man whose attention will be almost wholly directed to inserting the material into the furnace and withdrawing it therefrom after it has completed the cycle
20 of operation since only one burner is used and very little regulation thereof is required. The furnace will work under any desired temperature and can therefore be used for heat treating as well as for forging
25 work. It is well known that successful heating requires a radiating surface of sufficient area, a heating chamber of sufficient size to receive the combustible gases and a predetermined path for the furnace
30 gases to secure the desired heating effect. My improved furnace provides a large area of radiating surface in a compact space and the gases are compelled to travel along the surface of the material to be heated in a predetermined
35 path so that the most efficient results are obtained. The construction is such that only the spent gases are allowed to escape after they have imparted their heat to the walls of the heating chamber and the material
40 to be heated, and the circular construction reduces the radiation losses to a minimum.

I claim:

1. A rotary furnace comprising a circular
45 casing and a heating chamber enclosed therein, a fire brick wall disposed across said heating chamber and provided with openings therein to receive and support the material to be heated and to permit the passage
50 of gases therethrough from one side of said wall to the other along the surface of the material, and means for revolving the casing.

2. A rotary furnace comprising a circular casing and a heating chamber enclosed
55 therein, a partition wall across said chamber having a plurality of openings arranged in a circular series therethrough to receive and support the material to be heated and to permit the passage of gases therethrough from
60 one side of said wall to the other along the surface of the material, and means for revolving the casing.

3. A rotary furnace comprising a circular casing and a heating chamber enclosed
65 therein, a plurality of walls extending across

said chamber and having openings therethrough to receive and support the material to be treated and to permit the passage of gases therethrough along the surface of the material to be heated, and means for revolving
70 the casing.

4. A rotary furnace comprising a circular casing and a heating chamber enclosed therein, a plurality of walls extending across the chamber spaced apart and provided with a
75 plurality of registered openings to receive and support the material to be heated and to permit the passage of gases therethrough along the surface of the material, and means for revolving the furnace.

5. A rotary furnace comprising a circular casing and a heating chamber enclosed therein, a plurality of walls across the chamber and provided with a plurality of registered openings arranged in a circular series
85 to receive and support the material to be heated and permit the passage of gases therethrough along the surface of the material, and means for revolving the casing.

6. A rotary furnace comprising a circular casing and a heating chamber enclosed therein having a peripherally disposed flue adjacent one end thereof, a wall extending across the chamber and provided
90 with a plurality of openings therein arranged in a circular series adjacent the outer wall of the chamber to receive and support the material to be heated and to permit the passage of gases therethrough along the surface of the material, and
95 means for revolving the casing.

7. A rotary furnace comprising a circular casing, a brickwork lining for the outer wall and the rear end and a closure for the other end of the casing enclosing a heating
100 chamber, a burner supported in adjacent relation to the casing, said rear end of the casing having an opening registering with said burner and said closure for the front end of the casing having a work opening,
105 a support within said chamber having a plurality of openings therein to receive and support the material to be heated, and means for revolving the casing.

8. A rotary furnace comprising a circular
115 casing, a brickwork lining for the outer wall and the rear end of the casing enclosing a heating chamber, means for revolving the casing, a relatively stationary closure for the front end of the casing, and means
120 engaged by the casing for supporting the closure.

9. A rotary furnace comprising a circular casing having a heating chamber therein and open at its front end, means for revolving the casing, and a relatively stationary closure supported on the casing at the front end thereof.

10. A rotary furnace comprising a circular casing having a heating chamber there-
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in and open at its front end, means for revolving the casing, a relatively stationary closure hung on the casing at the front end thereof, and means co-acting with a revoluble portion of the furnace for holding said closure in fixed position flush against the front end of the casing.

11. A rotary furnace comprising a circular casing having a heating chamber therein and open at its front end, means for revolving the casing, a relatively stationary closure hung on the casing at the front end thereof, rollers on said closure engaging the casing, and means for holding said closure in fixed position flush against the front end of the casing.

12. A rotary furnace comprising a frame, supporting rollers mounted in the frame at the bottom thereof, guide rollers mounted at the sides thereof, a circular casing enclosing a heating chamber and arranged to travel on said rollers, and means including a pawl and ratchet for revolving the casing.

13. A rotary furnace comprising a frame, supporting and guiding rollers mounted in the frame, a circular casing enclosing the

heating chamber and open at one end and arranged to travel on said rollers, means for revolving the casing, a closure for the open end of the furnace, and means engaged by the casing for holding the closure in stationary position while the casing revolves.

14. A rotary furnace comprising a frame, supporting and guiding rollers mounted in the frame, a casing arranged to travel on said rollers and enclosing a heating chamber, an endless driving member around said casing, and pawl and ratchet means for driving said member to revolve the casing.

15. A rotary furnace comprising a frame, a circular casing enclosing a heating chamber and mounted to revolve in the frame, a driving shaft, driving connections between the driving shaft and the casing to revolve the casing, and means for driving said shaft in a step by step manner.

16. A rotary furnace comprising a heating chamber, an apertured fire brick wall disposed across said heating chamber to receive and support the material to be heated, and means for revolving the chamber.

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