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## ANNEALING FURNACE

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5 Claims. (Cl. 263—7)

My invention relates to annealing furnaces, more particularly to furnaces for the continuous bright annealing of metals, and has for its object to produce a furnace of improved construction with compact design, but having long length of travel in both the heating and cooling, eveness of heating and convenience in loading and unloading.

In my furnace the articles to be annealed are placed in pans or trays, introduced through a gas or water seal into the bottom of a heating chamber, caused to travel upwards to the top of the heating chamber on a helical ramp and thence through a transfer chamber to the top of a cooling chamber, then downwards on a helical ramp to the bottom of the cooling chamber, where they are discharged through a gas or water seal, the pans being returned to the starting point by a conveyor. I secure the travel of the pans through the heating and cooling chambers by the engagement of ribs on rotating cylinders with the pans, thereby dragging the pans through the chambers on the helical ramps. It is understood, of course, that I maintain a suitable atmosphere in the chambers and provide means for heating and cooling. For most classes of work I shall seal the inlet and discharge openings by gas locks, but for work in which tarnish by water stains is not objectionable, I may use a water seal.

By this construction, I am able to condense a long length of travel into small floor space, and to load and unload the material at one point, thereby conserving labor.

I also secure gradual heating and cooling of the articles, which is of great advantage in annealing wire of the finer gages on spools.

The foregoing and other features of my invention will now be described in connection with the accompanying drawings forming part of this specification in which I have represented my annealing furnace in a preferred form, after which I shall point out in the claims those features which I believe to be new and of my own invention.

In the drawings:

Figure 1 is an elevation in part section of my annealing furnace.

Figure 2 is a top view of same.

In carrying out my invention I employ a heating chamber 10 and a cooling chamber 20, each provided with spiral ramps 11 and 21. In the center of each of these chambers I provide a cylinder 12 and 22, adapted to revolve in bearings 13 and 23 respectively. Upon the cylindrical surface of these revolving cylinders I provide ribs 14 and 24 suitably formed and spaced to engage the side 31 of the traveling trays 30. These trays are provided with suitable rollers or casters 32 which run on the specially constructed ramps 11 and 21.

The cylinders 12 and 22 are driven by any suitable combination of gearing 40 provided in its train with a slip friction coupling 41 which will prevent jamming in the event of sticking of trays upon the ramp.

The entrance to the heating chamber 10 is indicated at 15 and the discharge from the cooling chamber 20 is indicated at 25 and are connected by a conveyor 55 which conveys the cars to the loading platform 57.

In Figure 2, the tray 30 is indicated at the loading platform ready to enter the heating chamber 10 through the gland 15 which is an opening sealed against ingress of air by either a water seal or gas lock of any well known design.

The tops of the chambers 10 and 20 are connected by a passageway or transfer chamber 60 and the rotating cylinders are sealed top and bottom by liquid seals 61.

The heating chamber 10 is provided with suitable heating coils 16 under the ramp 11 and side of chamber 10. In the cooling chamber 20 I may provide suitable refrigeration pipes 26 under the ramp 21 but instead of these cooling pipes I may cool by water spray or cool air from inside of the rotating drum 22.

It is understood that I maintain a suitable non-oxidizing atmosphere in the heating and cooling chambers and that the heating chamber is insulated against heat transference as shown at 19 and the joints may be liquid sealed to prevent leakage, as at 70.

From the above disclosure it will be apparent that the operation is quite simple. The tray 30 is loaded with the metal to be annealed and is passed through the entrance gland 15 where the vertical ribs 14 on the side of the revolving cylinder 12 engages the projection 31 of the tray provided for the purpose and the tray is conveyed along the spiral ramp to the top of the heating chamber, through a uniform heat, provided by the heating coils 16.

The tray then travels by gravity or by being pushed by the next succeeding tray across the transfer chamber 60 and into the cooling chamber where the vertical ribs 24 of the revolving cylinder 20 engages the projection 31 of the tray and thereby conveys the tray 30 down the ramp 21 to the discharge gland 25. After the tray 30 passes through this gland 25 it is picked up by conveyor 55 and brought to the place of beginning where the finished bright annealed metal is