No. 786,565. PATENTED APR. 4, 1905.

J. HUGHES.

ANNEALING FURNACE.

APPLICATION FILED SEPT. 16, 1904.

2 SHEETS—SHEET 1.

Fig. 1

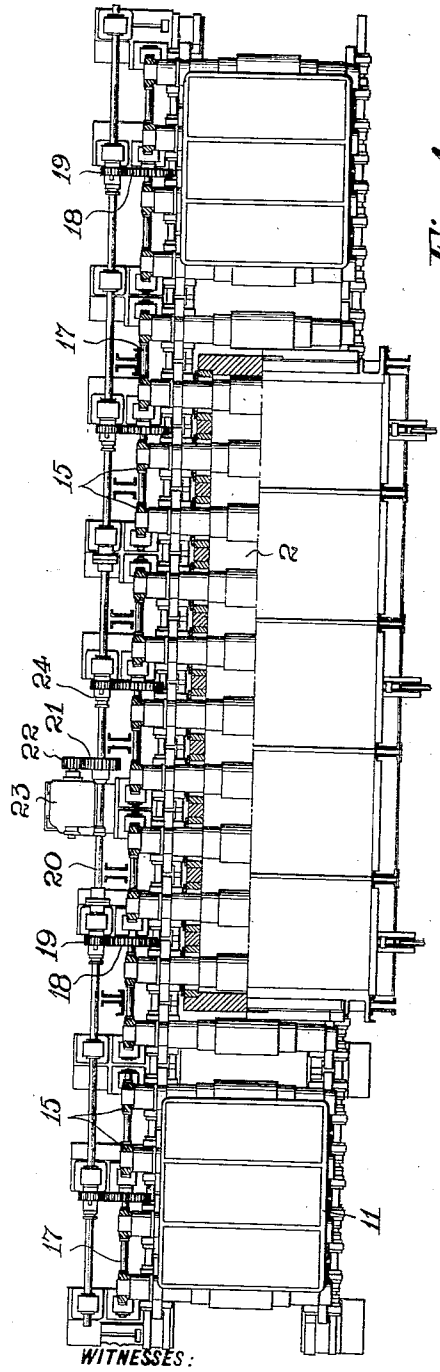
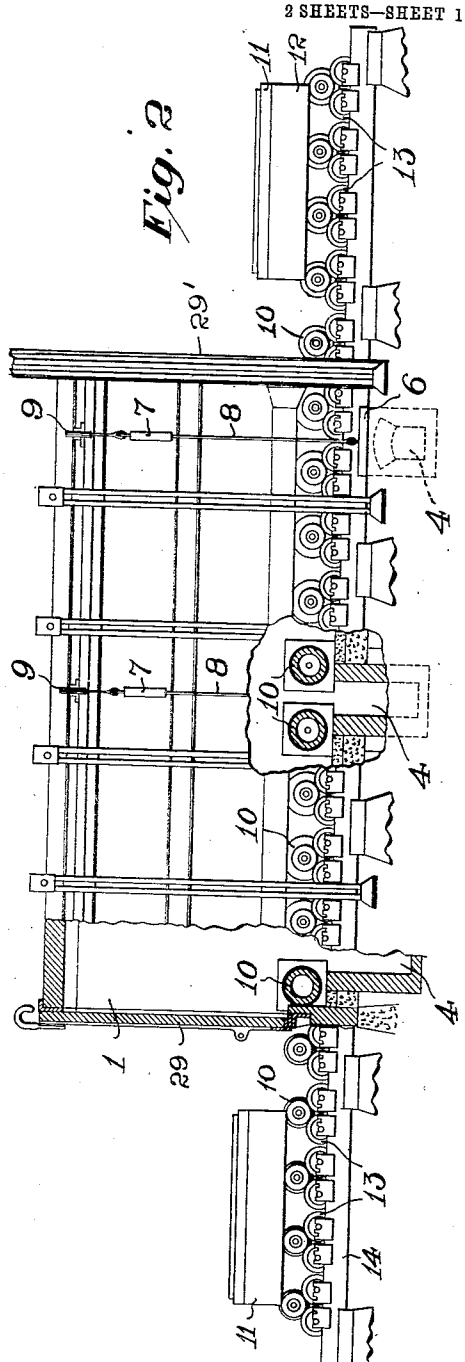


Fig. 2



WITNESSES:

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2 SHEETS—SHEET 2.

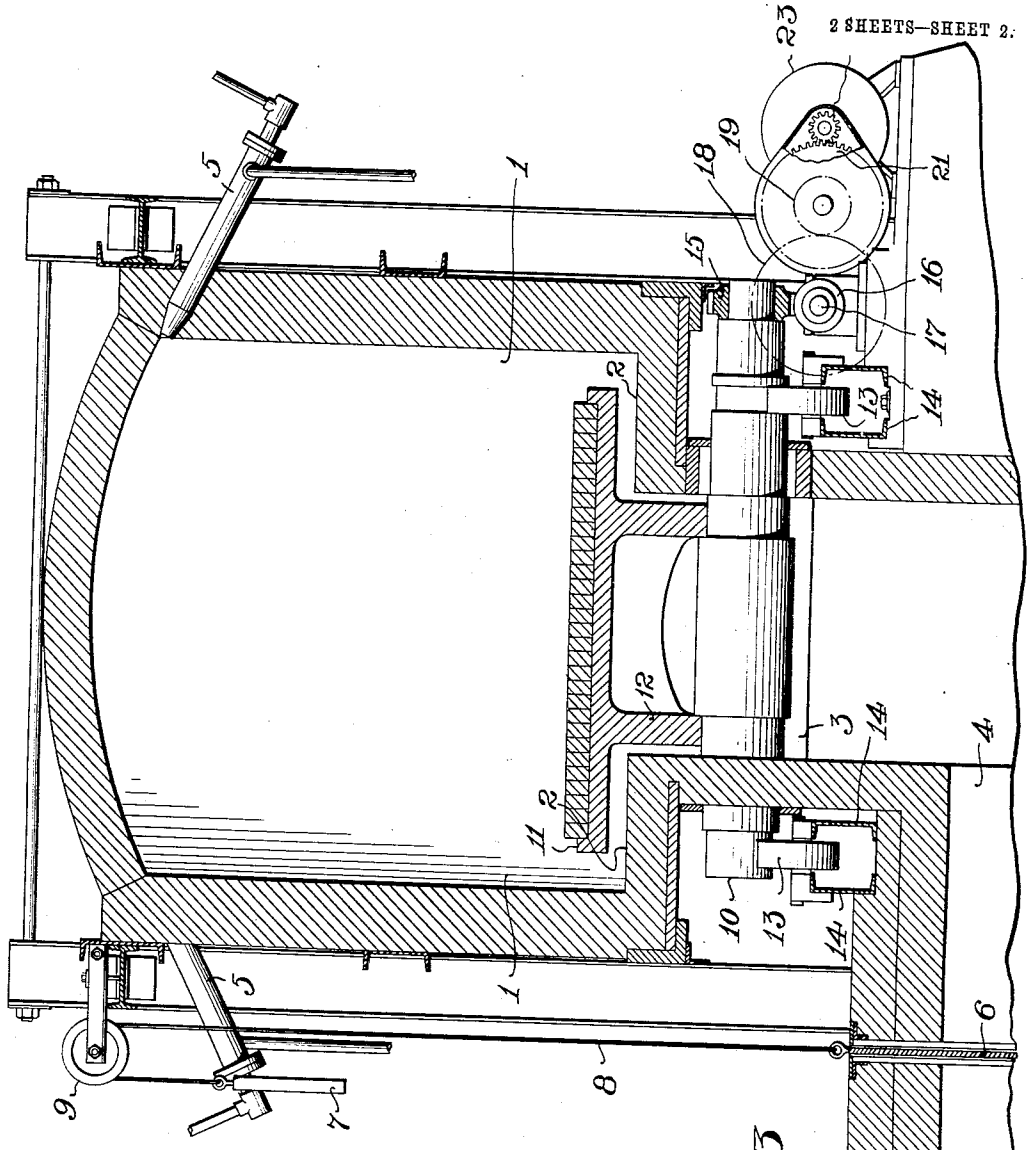

Fig. 3

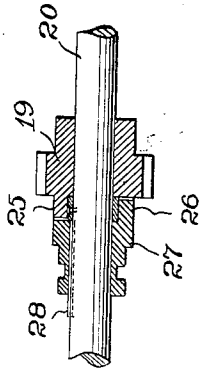

Fig. 4

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UNITED STATES PATENT OFFICE.

JOHNSON HUGHES, OF WISSAHICKON, PENNSYLVANIA.

ANNEALING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 786,565, dated April 4, 1905.

Application filed September 16, 1904. Serial No. 224,658.

To all whom it may concern:

Be it known that I, JOHNSON HUGHES, a citizen of the United States, residing at Wissahickon, county of Philadelphia, and State of Pennsylvania, have invented certain Improvements in Annealing-Furnaces, of which the following is a specification.

The leading object of this invention is to provide a furnace having means for simultaneously handling several lots of material as independent units, so as to treat the several units simultaneously, as each may require.

The nature and characteristic features of the improvements will more fully appear by reference to the following description and the accompanying drawings in illustration thereof, of which—

Figure 1 represents a plan view, partially in section, of a furnace embodying the improvements. Fig. 2 represents a side elevation and partial vertical section of the same. Fig. 3 represents a transverse vertical sectional view thereof, and Fig. 4 represents a longitudinal sectional view of a form of clutch that may be employed in practice of the invention.

As shown in the drawings, the furnace-chamber 1 has in its bottom 2 the longitudinal channel 3, communicating with the several transverse flues 4. At its top the chamber 1 has the burners 5 located in its side walls to produce a flame at the top thereof, and the several flues 4 are provided with dampers 6, by which the distribution and courses of the flame and hot gases may be controlled at will, the dampers being held at any desired position by means of the counterweights 7, having therewith the flexible connections 8, passing over the supporting-wheels 9.

Rollers 10, adapted for carrying the tables 11 into, through, and from the furnace-chamber 1, are supported on the roller-bearings 13, journaled on the longitudinal beams 14 exterior to the channel, the rollers being located below the general level of the bottom of the furnace-chamber and engaging the webs 12 of the tables, which are caused to travel along the bottom thereby. An end of each roller is provided with a worm-wheel 15, which is engaged by a worm 16 on a journaled shaft 17, a plurality of shafts being employed, each having a plurality of worms thereon and operating a plurality of rollers as a unit. Each shaft 17 has a spur-wheel 18 fixed thereon, with which there engages a pinion 19 on a journaled shaft 20, the latter being driven by the gears 21 and 22 and the motor 23. The several pinions 19 are engaged and disengaged with reference to the shaft 20 by means of a conventional form of clutch 24, the pinions 19 being normally loose on the shaft 20 and having the jaws 25, which are engaged by the jaws 26 of a sleeve 27, longitudinally movable, but revolubly held to the shaft by means of the spline 28.

Several tables 11, loaded on rollers 10 exterior to the furnace-chamber 1, may be passed through the door 29 in succession. The entering table is held in a current of modified temperature passing through the first flue 4 until the material has received its initial heat, when it is moved by the set of rollers on which it stands into the current of higher temperature passing through the second flue 4. This charge, while held stationary upon its set of rollers to acquire the higher temperature, is followed by a second charge of material, which is in like manner given its initial heat by the current passing through the first flue 4 at the same time that the first charge is being raised to the maximum temperature desired. When the first charge has been sufficiently heated, it is moved to the next set of rollers in the path of the modified current passing through the third flue 4, and the temperature is here drawn down to the point desired at which the charge is passed out of the furnace through the door 29′, the second and further charges being treated in like manner. As the materials carried by different tables are frequently of different size and character, it is sometimes desirable to hold particular charges in the furnace and at different points in the furnace a longer or shorter period than others, and this may readily be accomplished by the present improvements, since each set of rollers is capable of being operated or thrown out of action to handle any particular charge independently of the others, and the intensity of the several currents may be regulated at will.

Having described my invention, I claim—

1. In an annealing-furnace, a heating-chamber, a plurality of sets of rollers for carrying

materials in said chamber, and means for operating said sets of rollers together or separately, substantially as specified.

2. In an annealing-furnace, a heating-chamber, means for simultaneously varying the intensity of the heating operations at different zones of said chamber, a plurality of sets of rollers for carrying materials in said chamber, and means for operating said sets of rollers together or separately, substantially as specified.

3. In an annealing-furnace, a heating-chamber, means for introducing a flame near the top of said chamber, flues at various points along the bottom of said chamber for discharging the products of combustion, dampers for regulating said flues and controlling the heating-currents in said chamber, a plurality of sets of rollers for carrying materials in said chamber, and means for operating said sets of rollers together or separately, substantially as specified.

4. In an annealing-furnace, a heating-chamber having a channel extending along the bottom thereof, rollers extending across said channel and located below the general level of the bottom of said chamber, flues at several points along the length of said chamber for carrying off the gaseous products of combustion therefrom, dampers for controlling the respective flues, and means for heating said chamber, substantially as specified.

5. In an annealing-furnace, a heating-chamber, rollers in the bottom of said chamber, shafts respectively geared to a plurality of said rollers, a driving-shaft, and means for connecting and disconnecting said driving-shaft with relation to each of said first-named shafts, substantially as specified.

6. In an annealing-furnace, a heating-chamber, rollers extending through and beyond the ends of said chamber for carrying materials thereto, therethrough and therefrom, shafts respectively geared to a plurality of said rollers, a driving-shaft, and means for connecting and disconnecting said driving-shaft with relation to each of said first-named shafts, substantially as specified.

7. In an annealing-furnace, a heating chamber, rollers in said chamber, gears on corresponding ends of the respective rollers, a plurality of journaled shafts, gears on the respective journaled shafts engaging said roller-gears, a journaled driving-shaft, gears connecting said driving-shaft with each of said first-named shafts, and a clutch for engaging and disengaging said driving-shaft with each of said first-named shafts, substantially as specified.

In testimony whereof I have hereunto set my hand, this 14th day of September, A. D. 1904, in the presence of the subscribing witnesses.

JOHNSON HUGHES.

Witnesses:
JOHN THIEL,
UTLEY E. CRANE, Jr.