

No. 723,276.

PATENTED MAR. 24, 1903.

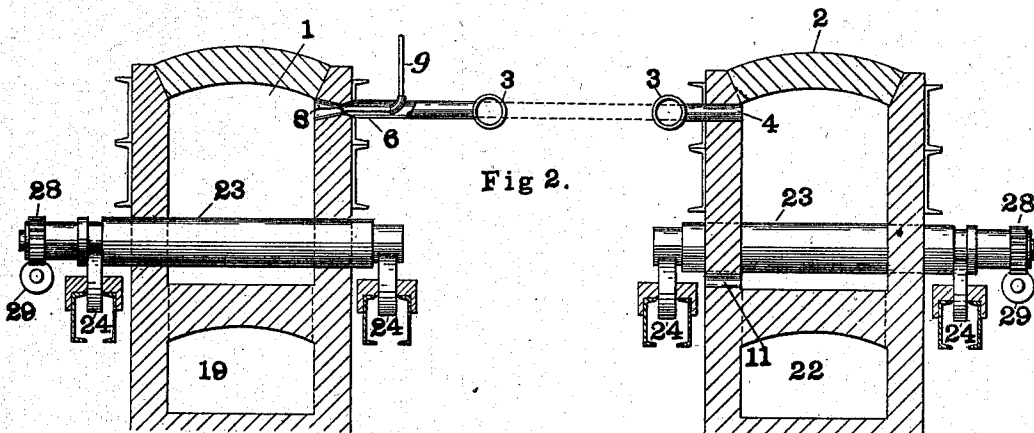
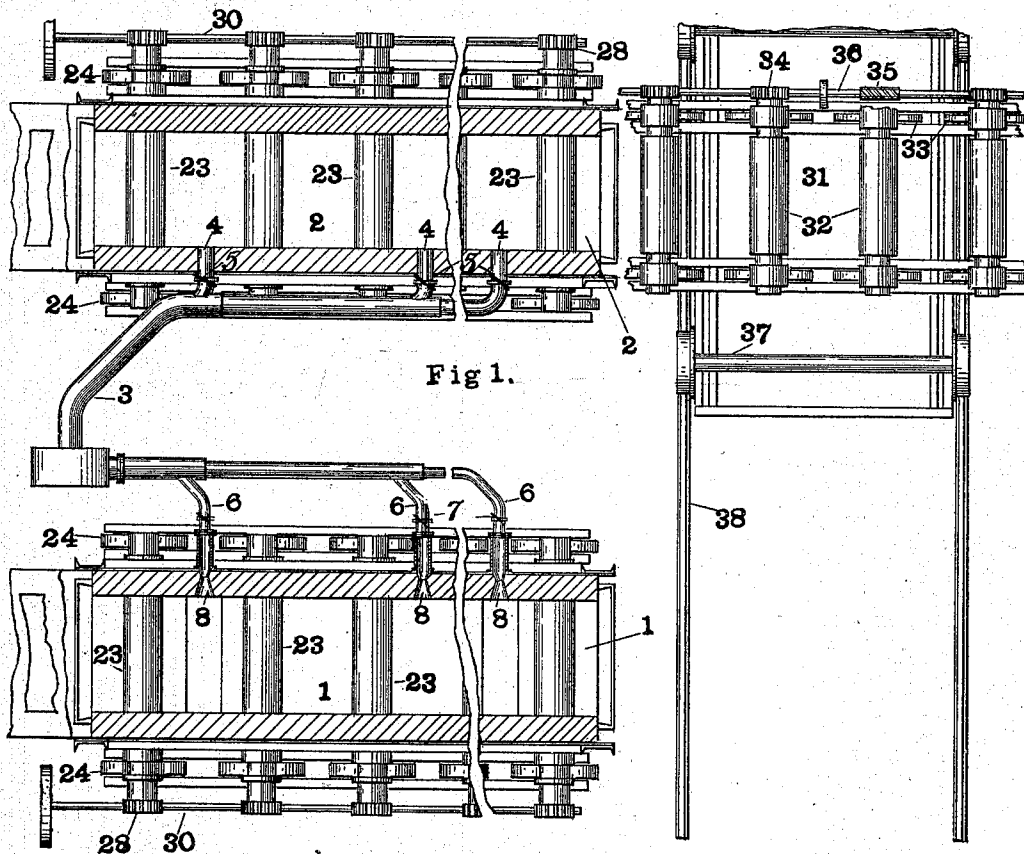
J. HUGHES.

ANNEALING SYSTEM.

NO MODEL.

APPLICATION FILED AUG. 26, 1902.

3 SHEETS--SHEET 1.



WITNESSES:

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Charles M. Carroll

INVENTOR.

Johnson Hughes

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ATTORNEY.

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3 SHEETS—SHEET 2.

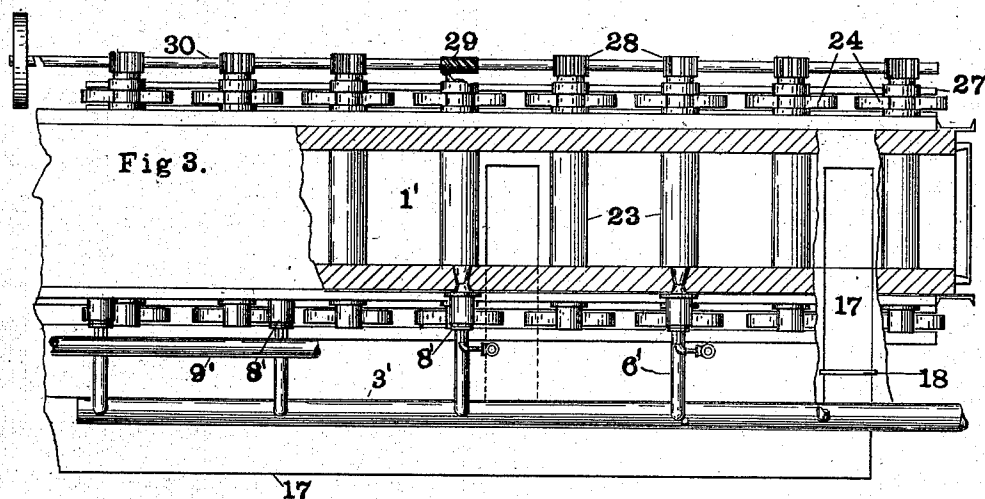


Fig 4.

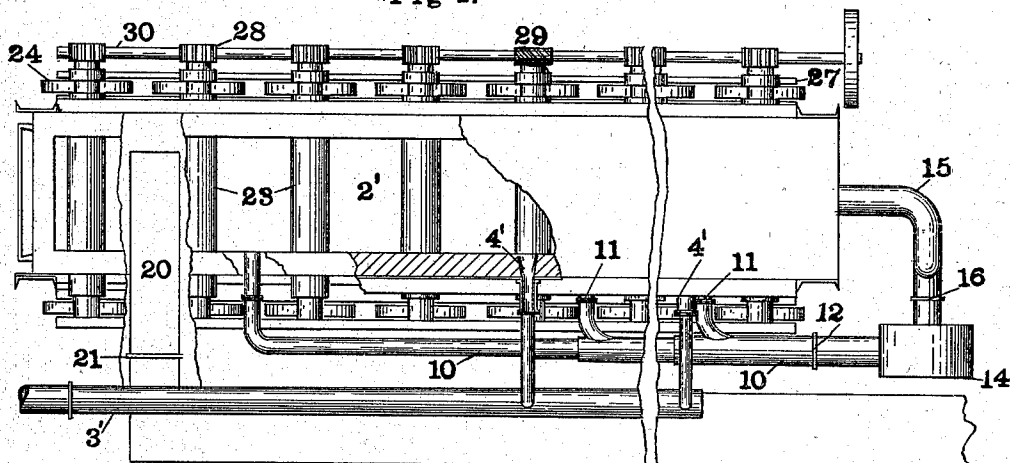
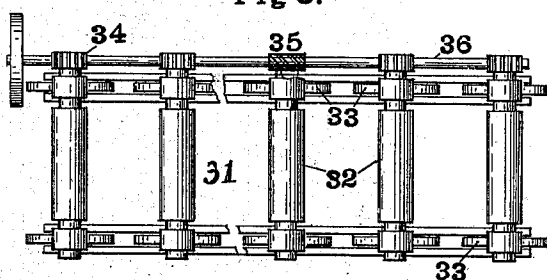


Fig 5.



Witnesses

Utley frame jr.

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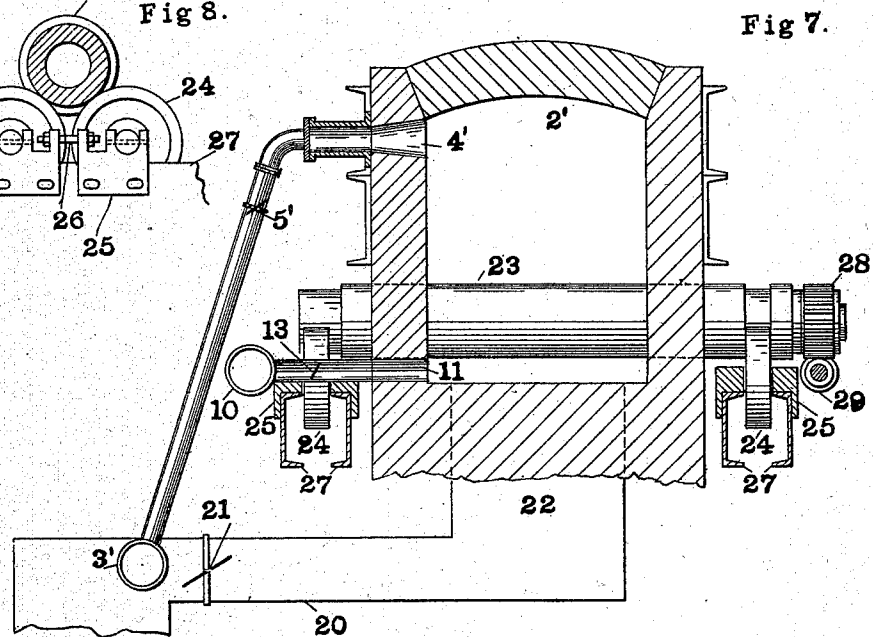
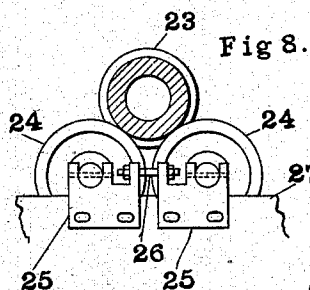
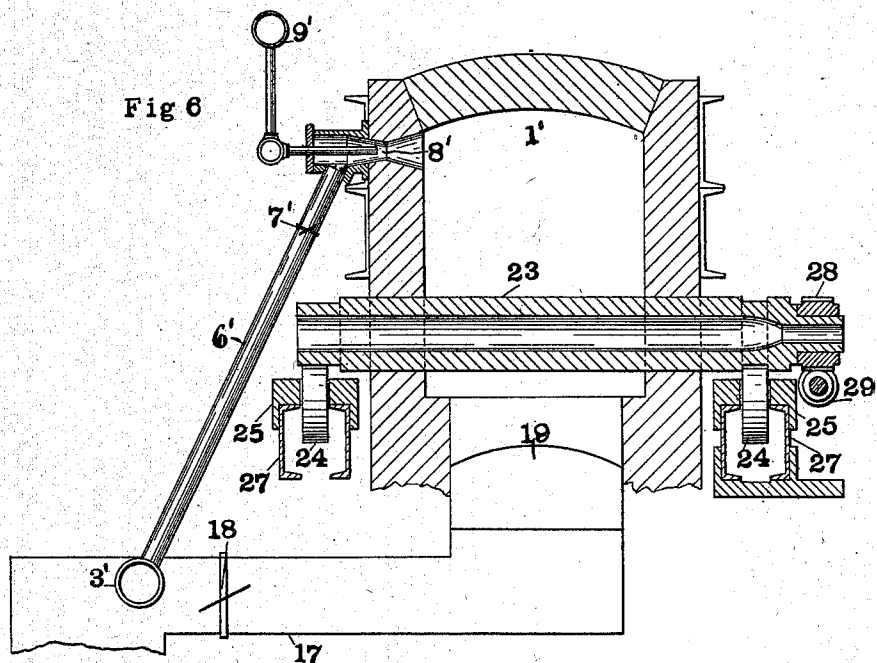
Attorney

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ANNEALING SYSTEM.

APPLICATION FILED AUG. 26, 1902.

NO MODEL.

3 SHEETS—SHEET 3.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHNSON HUGHES, OF PHILADELPHIA, PENNSYLVANIA.

ANNEALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 723,276, dated March 24, 1903.

Application filed August 26, 1902. Serial No. 121,068. (No model.)

To all whom it may concern:

Be it known that I, JOHNSON HUGHES, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented an Improved Annealing System, of which the following is a specification.

In annealing bars of various shapes the operations are frequently conducted with difficulty and at considerable expense without producing satisfactory results. In the case of eyebars the annealing, which is required to be performed after the heads or eyes have been forged on, has been attended by difficulties, owing to the inefficient means for handling, heating, and cooling the bars. In the usual practice of annealing the bars are given an objectionable warp in the direction of their widths, and consequently require straightening after annealing, to the injury of the molecular structure of the metal.

The chief objects of the present invention are to provide improved means for economizing heat, for uniformly heating and cooling the bars, for reducing the warping tendency, and for facilitating the operations of handling.

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

Figure 1 is a plan view, partially in section, representing an annealing system made in accordance with my invention. Fig. 2 is a transverse vertical sectional view of the construction illustrated in Fig. 1. Fig. 3 is a plan view, partially in section, representing a heating-chamber, with its connections, adapted for employment in a modified form of the system. Fig. 4 is a plan view, partially in section, representing a cooling-chamber, with its connections, adapted to be employed in line with the coacting construction shown in Fig. 3. Fig. 5 is a plan view of a transfer roller-table adapted for use with the constructions illustrated in Figs. 3 and 4. Fig. 6 is a transverse vertical sectional view of the construction illustrated in Fig. 3. Fig. 7 is a transverse vertical sectional view of the construction shown in Fig. 4, and Fig. 8 is a side view representing the roller-bearings for supporting the rolls.

As shown in Figs. 1 and 2, the heating-

chamber 1 and the muffle or cooling chamber 2 are arranged in parallel and connected by the air-conduit 3, which has the passages 4, with the valves 5 therein, connected at intervals with the interior of the cooling-chamber, and the passages 6, with the valves 7 therein, connected at intervals with the interior of the heating-chamber. The air-passages 6 have burners 8 therein connected with the fuel-pipes 9, by means of which the chamber 1 is heated through combining the fuel with hot air from the chamber 2.

As shown in Figs. 3 to 7, inclusive, the heating-chamber 1' and the muffle or cooling chamber 2' are adapted to be arranged in line either end to end or one above the other, with a transfer-table, such as shown in Fig. 5, connecting them. These chambers are connected by the air-conduit 3', which has the passages 4', provided with the valves 5', connected at intervals with the interior of the chamber 2', and the passages 6', provided with the valves 7', connected at intervals with the interior of the chamber 1'. The air-passages 6' have suitable burners 8' therein, which are connected with the fuel-pipe 9', by which hot air and powdered fuel, oil, or gas may be combined and burned in the heating-chamber.

The cooling-chamber has connected therewith a conduit 10, provided with inlets 11, having therein the respective valves 12 and 13, and a blower 14, connected with the conduit 10, forces air into the cooling-chamber. The blower may also be connected with an exhaust-pipe 15, having a damper 16 therein for exhausting the cooling-chamber. The heating-chamber is provided with the conduit 17, controlled by the damper 18 and communicating with the flues 19, and the cooling-chamber is provided with the conduit 20, controlled by the damper 21 and communicating with the flues 22. The conduits 17 and 20 have the pipe 3' located therein, by which the pipe and the air flowing there-through are heated by waste gases passing to the stack.

Each of the furnace-chambers is provided with a set of hollow rolls 23, adapted to be air or water cooled, the rolls being mounted on rollers 24, journaled in the movable bearings 25. The bearings have the adjusting

connections 26 and slide on the guides or ways 27, which permits the longitudinal adjustment of the rollers 24 and the vertical adjustment of the rolls 23 thereby. The rolls 23 are provided with the gears 28, which are engaged by corresponding worms 29 on the power-driven shafts 30.

A table 31 effects the transfer of materials to and from the respective chambers, the table being provided with the rolls 32, mounted on the roller-bearings 33, and having gears 34 thereon, which are engaged by worms 35 on the power-driven shaft 36. This table may be mounted on trucks 37 and move on a track 38. The eyebars or other shapes are carried from the transfer-table into the heating-chamber, where they are handled by the adjustable power-operated rolls upon which they rest and are brought to a uniform temperature of the degree required for annealing by means of the burners arranged for uniformly heating such shapes, the waste gases from the chamber escaping through the conduit leading to the stack and heating the pipe through which air is supplied to the burners. When brought to a uniform heat of the required degree, the shapes are transferred, by the intermediary of the roller-table, to the cooling-chamber, where they are handled by means of the adjustable power-operated rolls upon which they rest and are uniformly cooled by the regulation of the several appliances for changing the air in the cooling-chamber, the air that is heated by the heated bars in the cooling-chamber being carried to the burners and utilized in the flames for the heating-chamber.

It will be seen that the construction permits the chambers to be divided or shortened and the heating system cut off from a part thereof in case the shapes are of such character and length as not to require the use of the entire system.

Having described my invention, I claim—

1. In an annealing system, the combination of a heating-chamber, with a muffle or cooling chamber, and means for conveying to said heating-chamber air heated in said muffle-chamber, substantially as specified.

2. In an annealing system, the combination of a heating-chamber having rolls therein, with a muffle or cooling chamber having rolls therein, and a conduit for carrying heated air from said muffle-chamber to said heating-chamber, substantially as specified.

3. In an annealing system, the combination of a heating-chamber having vertically-adjustable rolls therein, with a muffle or cooling chamber having vertically-adjustable rolls therein, and a transfer roller-table adapted for charging and drawing said chambers, substantially as specified.

4. In an annealing system, a heating-cham-

ber, a plurality of burners therefor, a muffle or cooling chamber, and a conduit connected with said muffle-chamber and said burners, said conduit being adapted for carrying heated air from said muffle to said burners, substantially as specified.

5. In an annealing system, the combination of a heating-chamber, with a muffle or cooling chamber, a conduit for supplying blast to said muffle, and a conduit leading from said muffle to said heating-chamber, substantially as specified.

6. In an annealing system, a muffle, a blast-pipe having a plurality of inlets to said muffle, an exhaust-pipe leading from said muffle, and valves for controlling said pipes, substantially as specified.

7. In an annealing system, a muffle, a blast-pipe having a plurality of valved inlets to said muffle, and a valved conduit leading from said muffle, substantially as specified.

8. In an annealing system, the combination of a heating-chamber having adjustable rolls therein, with a muffle or cooling chamber having adjustable rolls therein, and transfer mechanism connecting said chambers, substantially as specified.

9. In an annealing system, a heating-chamber, rolls in said heating-chamber having gears thereon, a revoluble shaft having mechanism gearing with and revolving said gears, in combination with a muffle or cooling chamber, rolls in said cooling-chamber having gears thereon, a revoluble shaft having mechanism gearing with and revolving said last-named gears, and transfer mechanism connecting said chambers, substantially as specified.

10. In an annealing system, a heating-chamber, a muffle or cooling chamber, and a conduit having a plurality of connections with said cooling-chamber and a plurality of connections with said heating-chamber, substantially as specified.

11. In an annealing system, a heating-chamber, a series of burners therefor, a conduit connected with said burners for supplying air thereto, and a conduit leading from said chamber in which said first-named conduit is located, substantially as specified.

12. In an annealing system, a heating-chamber, a series of burners therefor, a conduit having valved passages for supplying air to said burners, and a conduit leading from said chamber in which said first-named conduit is located, substantially as specified.

In testimony whereof I have hereunto set my hand, in the presence of the subscribing witnesses, this 18th day of August, A. D. 1902.

JOHNSON HUGHES.

Witnesses:

ROBT. E. MCGOUGH,
GEORGE D. HUGHES.