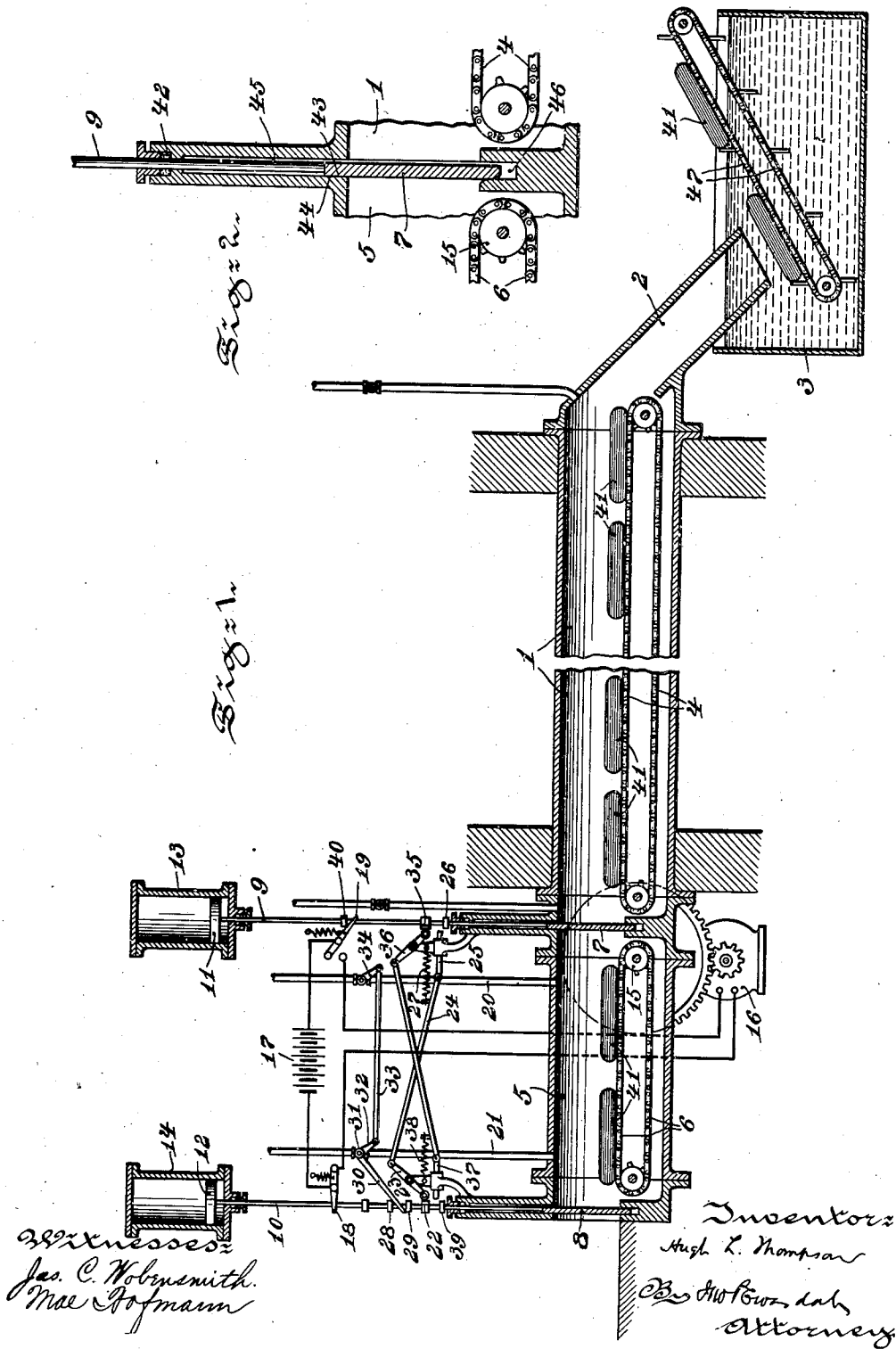


No. 890,251.

PATENTED JUNE 9, 1908.

H. L. THOMPSON.
ANNEALING FURNACE.
APPLICATION FILED MAY 20, 1905.



UNITED STATES PATENT OFFICE.

HUGH L. THOMPSON, OF WATERBURY, CONNECTICUT.

ANNEALING-FURNACE.

No. 890,251.

Specification of Letters Patent.

Patented June 9, 1908.

Application filed May 20, 1905. Serial No. 261,341.

To all whom it may concern:

Be it known that I, HUGH L. THOMPSON, a citizen of the United States, residing at Waterbury, in the county of New Haven, State of Connecticut, have invented a new and useful Annealing-Furnace, of which the following is a specification.

My invention relates to annealing furnaces in which the oxidizing atmosphere is excluded from the metal during treatment and until the same has been cooled.

My object is to provide improved means for delivering the metal to the furnace retort without admitting the oxidizing atmosphere thereto.

My invention comprises an annealing retort and a mechanical air lock through which the material is charged into the retort. This air lock or preliminary charging member is adapted to be opened to the retort after the oxidizing atmosphere has been exhausted from the said chamber.

My invention also includes improved means for opening and closing communication between said preliminary charging chamber and the retort, and also for opening and closing said preliminary chamber to the outside atmosphere.

My invention also includes means for delivering the metal from the preliminary chamber to the retort and automatic means for coupling up the various operating mechanisms.

The specific device herein described is especially adapted for the annealing of coils of bright metal wire, but my invention is of course equally adapted for treating other forms of metal.

Referring to the drawings:—Figure 1 is a longitudinal vertical section of an annealing furnace showing my improved mechanism. Fig. 2 is a fragmentary view in vertical section showing with more detail the gate or valve operating between the preliminary charging chamber and the retort.

Similar numerals refer to similar parts throughout the several views.

The retort 1 is of the usual form, having a discharging extension 2 projecting downwardly into the tank 3. The lower end of extension 2 is adapted to be immersed in the water contained in the tank. In the retort 1 is also provided the conveyer 4 running from

end to end of said retort and entirely inclosed therein. At the receiving end of the retort 1 is provided the preliminary charging chamber 5 having conveyer 6 extending from end to end thereof. Communication between chamber 5 and retort 1 is opened and closed by the vertically moving valve or gate 7; while the opening to the outside atmosphere is controlled by the valve or gate 8. Gates 7 and 8 are operated by the vertical piston rods 9 and 10 connected with the pistons 11 and 12 operating in cylinders 13 and 14. These pistons are preferably operated by the introduction of compressed air into said cylinders 13 and 14. The usual admission and exhaust valves are employed in this connection, but are not shown in the drawings. The conveyer 6 is operated by suitable gearing connected with pulley 15 see Fig. 2 driven by motor 16 from source of energy 17 controlled by the switches 18 and 19. The pipe 20 is adapted to introduce steam, gas or other non-oxidizing agent into the preliminary charging chamber 5, while pipe 21 is adapted to carry off the oxidizing atmosphere expelled from said chamber. The coupling of these various mechanisms is accomplished in the following way: Upon rod 10 is provided the lug or nut 22 which is adapted to engage one end of rocking lever 23 to hold the same in the position shown in Fig. 1, when the gate 8 is closed. This rocking lever has pivotally secured at its other end the connecting rod 24 which in turn is secured to the bolt 25 which is adapted to engage with the nut or lug 26 on rod 9 to prevent the opening of gate 7. When the gate 8 is closed this bolt 25 is withdrawn from engagement with lug 26 so as to permit the opening of gate 7. When however rod 10 is elevated to open gate 8 lug 22 is raised to permit the outward movement of rocking lever 23 in response to the tension of spring 27 to permit the moving of bolt 25 to lock gate 7 closed. Above lug 22 on rod 10 are located the lugs or nuts 28 and 29. These lugs are adapted to encounter either side of the outer end of bell crank member 30. This bell crank member 30 may be connected directly with the stem of valve 31. The other extension 32 of bell crank member 30 is pivotally secured to the connecting rod 33 which in turn is connected with the valve 34.

In Fig. 1 these valves are shown in the open position to permit the entering of steam, gas or other non-oxidizing agent and the exit of air from chamber 5. When, however rod 10 is elevated to open gate 8 these valves are closed by the operation of lug 29 upon bell crank 30.

When the metal has been charged into the preliminary chamber 5 the reverse movement of rod 10 takes place to close gate 8. This obviously causes the opposite actuation of the valves 31 and 34 and of the bolt 25 so that chamber 5 will now be exhausted of oxidizing atmosphere and the gate 7 will be permitted to open. By introducing air into the lower part of cylinder 13 the rod 9 is elevated to cause the opening of gate 7. By the withdrawal of lug 35 from the free end of rocking lever 36 the bolt 37 is moved by spring 38 to intercept lug 39 to lock gate 8 against opening. At the same time lug 40 encounters the lower end of switch 19 to close the circuit of motor 16 to operate conveyer 6 to carry the metal 41 to conveyer 4 in retort 1. It will be obvious that the reverse movement of rod 9 to close gate 7, will open the circuit of the motor to stop conveyer 6 and will then withdraw bolt 37 to unlock gate 8.

It will thus be seen that by the mechanism above described the gate 7 cannot be opened while gate 8 is open, nor can gate 8 be opened while gate 7 is open. The closing of gate 8 opens the valves for the admission of non-oxidizing agent and the escape of oxidizing atmosphere, while the opening of said gate closes said valves, and the opening of gate 7 starts the conveyer 6 while the closing of gate 7 stops conveyer 6.

In order to make the closure of the intake end of the retort by gate 7 substantially air tight, the following construction may be employed as shown in Fig. 2. The rod 9 is packed in the usual way as at 42. The co-operating faces 43 and 44 of gate 7 and adjoining wall are suitably milled or ground to make as perfect a fit as practicable. A slight play is permitted between gate 7 and channel 45, the cooperation of the ground faces being aided by the slight pressure maintained in retort 1. The extension 46 of the channel 45 below the lower end of gate 7 is provided for accumulation of dirt or other substances, which may from time to time be blown out by steam or other suitable means.

The inclined conveyer 47 may be provided extending from beneath the opening of discharge end 2 to receive the metal coils and carry them out of tank 3.

It will of course be understood that the construction of the gates 7 and 8 will be in accordance with the usual furnace construction practice as to heat resisting characteristics.

My device is especially useful in the an-

nealing of metals which it is not desirable to pass through a liquid before entering the retort.

What I claim is:—

1. In combination with an annealing furnace, a chamber adapted to communicate with the furnace, means for opening and closing communication between the chamber and furnace, means for opening and closing said chamber to the outside atmosphere and means for displacing the oxidizing atmosphere in the chamber by a non-oxidizing agent before opening it to the furnace.

2. In an annealing furnace, the combination of a retort and a preliminary charging chamber therefor, provided with movable gates and an air exit and means for introducing a non-oxidizing agent to exhaust the oxidizing atmosphere from said chamber after it has received the metal and before it delivers to the retort.

3. In an annealing furnace, the combination of a retort and a preliminary charging chamber therefor, having a movable gate, and means controlled by the movable gate for introducing a non-oxidizing agent to said chamber to expel the oxidizing atmosphere from said chamber after it has received the metal and before it delivers to the retort.

4. In an annealing furnace, the combination of a retort and a preliminary charging chamber therefor, having a movable gate, means for introducing a non-oxidizing agent to said chamber to expel the oxidizing atmosphere from said chamber after it has received the metal and before it delivers to the retort, and a conveyer controlled by the movable gate.

5. In an annealing furnace, the combination of a retort and a preliminary charging chamber therefor, having a pair of movable gates, means for introducing a non-oxidizing agent to said chamber to expel the oxidizing atmosphere from said chamber after it has received the metal and before it delivers to the retort, and automatic means for locking either gate closed while the other gate is open.

6. In an annealing furnace, the combination of a retort, a preliminary charging chamber therefor, a pair of gates for closing said chamber one from the outside atmosphere and the other from the retort, means for introducing a non-oxidizing agent into the chamber and means whereby the closing of the chamber from the outside atmosphere causes the introduction of said agent.

7. In an annealing furnace, the combination of a retort, a preliminary charging chamber therefor, a pair of gates for closing said chamber, one from the outside atmosphere and the other from the retort, means for introducing a non-oxidizing agent into the chamber and means whereby the opening of the chamber to the retort will cause the locking of the other gate.

8. In an annealing furnace, the combination of a retort, a preliminary charging chamber, a conveyer operating therein for receiving the metal to be annealed and for delivering the same to the retort, a pair of gates for closing said chamber, one from the outside atmosphere and the other from the retort, and means whereby the opening of the gate to the retort controls the operation of the conveyer.

9. In an annealing furnace, the combination of a retort, a preliminary charging chamber, a pair of pneumatically operated gates, one for closing the chamber from the outside atmosphere, the other from the retort and

automatic means whereby when either gate is opened the other gate is locked closed.

10. In an annealing furnace, the combination of a retort, a preliminary charging chamber, a pneumatically operated gate for closing the chamber from the outside atmosphere, an inlet conductor and an outlet conductor communicating with said chamber, valves for controlling said conductors, and automatic means operated by the gate actuating mechanism for controlling the valves.

HUGH L. THOMPSON.

Witnesses:

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MAE HOFMANN.