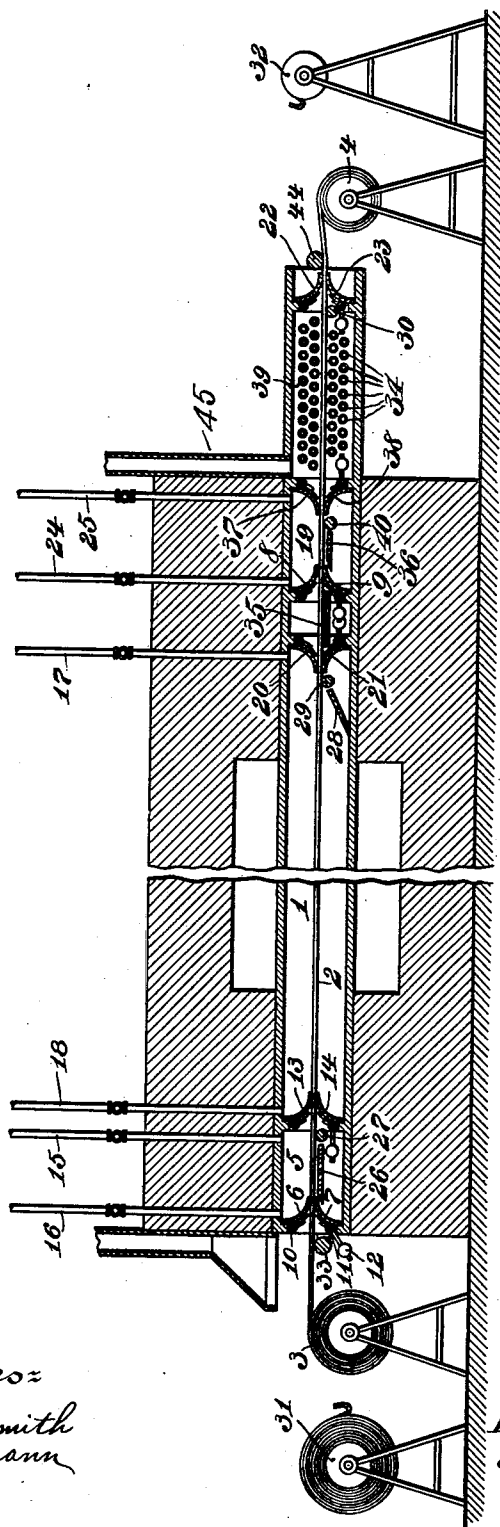


No. 890,252.

H. L. THOMPSON. PATENTED JUNE 9, 1908.
ANNEALING FURNACE.
APPLICATION FILED JAN. 23, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

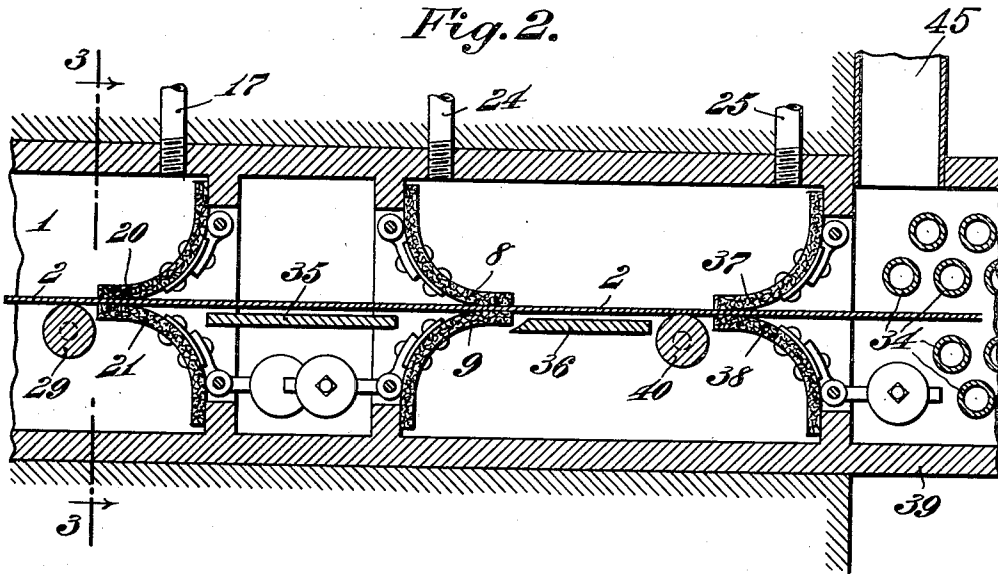
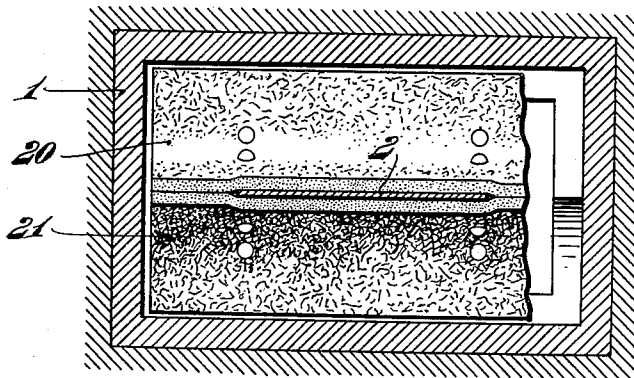


Fig. 3.



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ANNEALING-FURNACE.

No. 890,252.

Specification of Letters Patent.

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Application filed January 22, 1908. Serial No. 412,049.

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 and 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 carried into the retort.

My improved means is especially adapted for the treatment of metal in the form of sheets, but may obviously be used for metal in other forms by the proper shaping of the valves or gates.

This invention especially comprises the combination of cooperating valves or gates made in whole or in part of flexible or yielding material, having their free ends or extensions directed into the retort or other chamber and so operating that the efficiency of closure of said gates shall be in direct proportion to the above atmospheric pressure of the said chamber.

My improved annealing furnace is especially adapted for continuous operation and includes a preliminary chamber through which the metal must pass before reaching the retort chamber. This preliminary chamber is mechanically sealed from the outside atmosphere and is also mechanically sealed from the retort and means are provided for exhausting the oxidizing atmosphere from this preliminary chamber throughout the operation of the device.

My invention also comprises a similar chamber at the discharge end of the retort which is also provided with means for exhausting the oxidizing atmosphere therefrom. I also provide means at or near the discharge end of the retort for the cooling of the metal as it passes therethrough so that as the metal is delivered to the outside atmosphere it has been so reduced in temperature as not to be oxidized thereby.

Referring to the drawings:—Figure 1 is a longitudinal vertical section of an annealing furnace showing my improved mechanism. Fig. 2 is a fragmentary longitudinal vertical section on an enlarged scale. Fig. 3 is a cross section on line 3, 3 of Fig. 2.

Similar numerals refer to similar parts throughout the several views.

Referring to Fig. 1, 1 represents the retort of the usual form through which the metal 2 is carried from reel 3 to reel 4. Before the metal 2 reaches the retort 1 however it is passed through the preliminary charging chamber 5 which is maintained automatically closed against the outside atmosphere by the flexible gates 6 and 7. These gates are composed of asbestos, felt or other flexible material and are preferably stiffened by the framework which are secured to hinges 10 and 11 operatively connected with the stationary structure. Primarily the flexible gate 6 is maintained closed against the metal by gravity, while the flexible gate 7 is maintained closed by the counterbalance 12. It is to be noted that the gates 13 and 14, and 20 and 21 are so directed that pressure above atmosphere in the retort will increase the efficiency of closure of said gates. The preliminary charging chamber is also sealed against the retort by the flexible gates 13 and 14 supported and operating in substantially the same manner as 6 and 7. Steam is introduced through pipe 15 to force the oxidizing atmosphere out of chamber 5 through pipe 16 so that the metal traveling through the gates 13 and 14 carries practically no oxidizing atmosphere into the retort 1. The retort 1 is kept free of oxidizing atmosphere in the usual way by the introduction of steam through pipe 17 to expel the oxidizing atmosphere through pipe 18. At the discharge end of retort 1 is provided a supplemental chamber 19, sealed from the retort by the flexible gates 20 and 21 and 8 and 9, the construction and operation of gates 8 and 9, and 37 and 38, are substantially the same as that described in connection with gates 13, 14, 20 and 21, the double pair of gates between retort 1 and chamber 19, being provided to resist any counterbalancing pressure either in retort 1 or chamber 19. Steam is introduced into chamber 19 through pipe 24 and oxidizing atmosphere

expelled through pipe 25. At the discharge end of chamber 19 is provided the cooling chamber 39 sealed therefrom by the flexible gates 37 and 38 having similar construction and operation. Within the chamber 39 is provided a coil or nest of cooling pipe 34 which is adapted to surround the metal 2 as the same passes through the chamber. The purpose of this cooling device is to reduce the temperature of the metal so that it will not be subject to the oxidizing effect of the outside atmosphere when discharged from said chamber 39. This chamber 39 is provided with a ventilating flue 45 to carry the moisture quickly away from the mouth of the retort. For the purpose of introducing the first piece of metal through the retort and chambers I provide in chamber 5 the platform 26 and roller 27 for supporting and guiding the metal through gates 13 and 14. The metal may then be pushed along the bottom of retort until it comes to the incline 28 when it is carried upwardly over roller 29 through gates 20 and 21. Suitable platforms 28, 35 and 36 and suitable rollers such as 27, 29, 30 and 40 will serve to direct the metal through the several gates of the other chambers. It will also be understood that the several gates 20 and 21 and 37 and 38 may be arbitrarily opened, to receive the end of the metal, by any suitable means such for instance as handle or keys (not shown) connected therewith and projecting through the walls of the furnace. When the metal is once threaded through the device one sheet is made to pull another through after it, that is, a supplemental reel such as 31 is usually provided and as reel 3 has become nearly empty the end of metal 2 is secured by any of the well known devices provided for this purpose to the metal on reel 31. When reel 4 is full the metal on the reel is separated from the metal coming through the retort by any suitable well known device and the supplemental reel such as 32 is connected with the metal coming from the retort and so on. Suitable means are provided for rotating the reels so as to draw the metal through the retort and wind the same on said reels. These are well known devices and are not described by me as they form no part of my invention. If at any time it is desired to interrupt the annealing process a dummy band of metal may be carried through the furnace so as to project from either end thereof so that when it is desired to start the annealing process again the metal may be attached to this dummy at one end while the other end of the dummy is secured to the rotating reel to draw metal through as above described. It will thus be evident that by shifting from an empty reel to a full reel at the charging end of the furnace and from a full reel to an empty reel at the discharging end of the furnace from

time to time as the same becomes necessary the annealing operation may be made continuous.

The roller 33 is especially adapted to maintain the position of the metal as it enters the first pair of gates 6 and 7 so that it will always be maintained properly centered between said gates. The roller 27 serves a similar purpose with respect to gates 13 and 14, roller 29 with respect to gates 20 and 21, while the overhanging roller 44 serves the same purpose with respect to gates 22 and 23; the position of reel 4 being such as to always maintain the metal 2 either at the same elevation or slightly above the elevation of the lowest point of roller 44.

Fig. 3 is a cross section of the retort showing an elevation of gates 20 and 21 in the operative position; part of these gates being broken away to show the interior construction.

As above stated, the gates are composed of a flexible material such as asbestos or felt suitably treated to resist the heat. These gates are pressed firmly together so that they will lie close to the metal 2 as the same passes between them. Fig. 3 shows these gates closed together at either side of the metal 2 so as to form a substantially air tight seal around the metal.

The special object of facing the gates 13 and 14 toward gates 20 and 21, that is, towards the interior of the retort 1, is to secure an efficiency of closure of said gates in direct proportion to the above atmospheric pressure in said retort.

While I have shown the chambers 5 and 19 combined with retort 1, it is obvious that either chamber may be used without the other by employing some other form of seal such as the ordinary water seal at one end of the retort.

What I claim is:—

1. In an annealing furnace, the combination of a retort, an air lock connected therewith, and means for closing the retort chamber and air lock chamber from the outside atmosphere and also from each other, comprising a plurality of gates formed of yielding material, adapted to permit the passage of the metal to be annealed without undue leak of gas, said gates being so directed with respect to a chamber as to have an efficiency of closure relative to the above-atmospheric pressure therein.

2. In an annealing furnace, the combination of a retort and an air lock connected therewith, means for closing the ends of the retort and of the air lock, comprising gates of flexible or yielding material adapted to permit the passage of the metal without permitting the leak of gas, said gates being so directed that the pressure in a chamber will contribute to the efficiency of closure of its gates.

3. In an annealing furnace, the combination of a retort, an air lock connected therewith, and means for closing each end of the retort and each end of the air lock, comprising
5 ing cooperating gates of flexible material having their free ends directed inwardly toward the chambers they are adapted to

close, and arranged to be affected as to efficiency of closure by the pressure in said chamber.

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