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H. C. WELLER

2,458,040

LEHR

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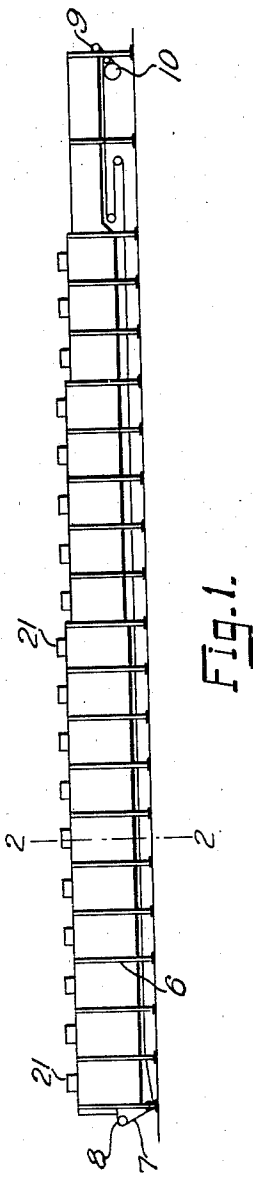


Fig. 1.

Fig. 3.

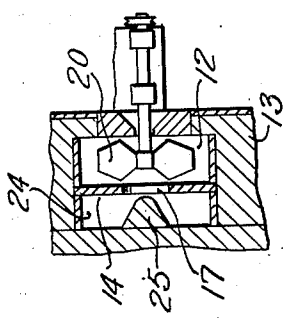
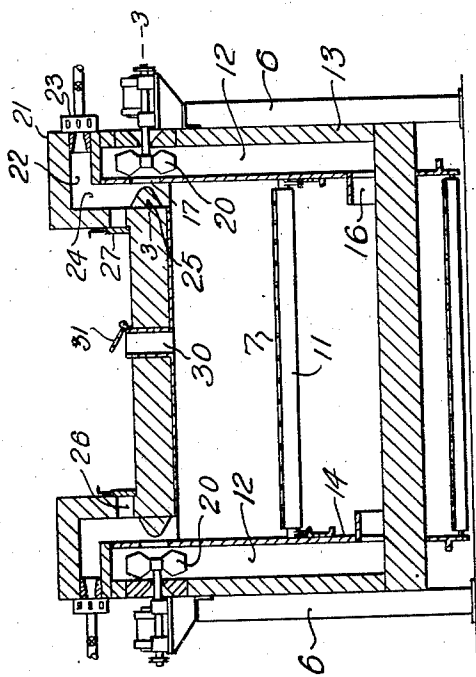


Fig. 2.



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UNITED STATES PATENT OFFICE

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LEHR

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3 Claims. (Cl. 49—47)

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The present invention relates to glass-annealing lehrs of the type embodying a relatively long tunnel through which the glassware is passed for annealing. Certain kinds of glassware admit of being annealed in an atmosphere containing products of combustion and, therefore, admit of being annealed in a direct fired lehr. It is with direct fired lehrs that the present invention is concerned, and it is the object of the invention to provide improvements in means for controlling the temperature gradient in the lehr tunnel in a simple and practical manner.

For a consideration of what I believe to be novel and my invention, attention is directed to the following specification and the claims appended thereto.

In the drawings,

Fig. 1 is a side elevation of a lehr embodying the present invention.

Fig. 2 is a vertical cross section on line 2—2 of Fig. 1.

Fig. 3 is an enlarged horizontal section on line 3—3 of Fig. 2.

The lehr comprises the usual exterior metal frame work 6 for supporting the lehr tunnel. The glassware is conveyed through the lehr tunnel on a perforate endless belt 7, the belt being perforate to permit a stream of gas to be passed vertically therethrough. The return strand of the belt is outside of said tunnel below the latter. At the ware entrance end of the tunnel there is a roller 8 from which the belt passes into the tunnel and at the ware exit end of the tunnel there is a roller 9 from which the belt passes downwardly to a driving drum 10. Inside of the tunnel the belt is supported on a bed of rollers 11. The construction thus far described involves nothing new.

In the present invention there is provided along the sides of the lehr tunnel a plurality of vertical ducts 12 which will ordinarily be comprised of channels in the side walls 13 of the tunnel and a tunnel-facing plate 14 for said channel. Each duct has a bottom outlet 16 and a top inlet port 17 and within each duct there is positioned a centrifugal fan 20 in axial alinement with the inlet port 17 for drawing or pulling tunnel gases into the duct and for forcing them downwardly therein for discharge into the tunnel space below the conveyor whereby to cause the tunnel atmosphere as a whole to circulate vertically through the conveyor belt.

In the present invention the tunnel gases that are being caused to flow through the said vertical ducts 12 are tempered during their flow

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through the ducts by admixture with a temperature modifying gaseous medium from gas generators 21 individual to said ducts so that the temperature gradient in the tunnel may be controlled by varying the temperature of the individual streams of gas being forced through said ducts. Each gas generator 21 comprises a closed combustion chamber 22 whereinto a burner 23 fires for producing hot combustion gases therein; and these hot combustion gases are conducted to the duct inlet port 17 by means comprising a hot gas passage 24 and the suction produced by the fan 20 with resultant heating of the tunnel gases drawn into said ducts. To induce the hot combustion gases and the tunnel gases to intermix to a greater or less degree in advance of the duct inlet 17 there may be provided in front of the latter in the passage 24 a conical baffle 25. By varying the amount of fuel supplied to the individual combustion chambers 22 and thus varying the amount of hot gases produced therein, the temperature of the gas streams flowing through the circulating ducts associated therewith may of course be varied accordingly. In those portions of the lehr tunnel where the heat requirements are low, the hot gases may be cooled by dilution with atmospheric air. To this end there may be provided an air inlet port 26 which opens on the passage 24, the effective inlet area of this port being controlled by an adjustable damper 27.

Because the tunnel atmosphere is being continuously augmented by fresh gases from the gas generator 21 it will ordinarily be desirable to provide for the escape of the excess atmosphere at a plurality of points other than or in addition to, the front and rear ends of the lehr tunnel and to this end there may be provided in the roof of the tunnel a longitudinal series of exhaust flues 30 whose effective outlet area may be controlled by individual dampers 31.

From the foregoing specification it will be readily apparent that the present invention provides a relatively simple and unique combination of means for employing burner gases for controlling the temperature gradient in the lehr tunnel and at the same time obtaining vertical circulation of the tunnel gases.

What I claim as new is:

1. Annealing apparatus comprising, in combination, wall means forming a relatively long annealing tunnel, conveyor means for advancing the articles to be treated through the tunnel at a level intermediate the top and bottom thereof so that the tunnel is virtually divided into upper

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and lower zones by said means, a longitudinally extending series of individual gas ducts interconnecting said upper and lower zones to provide a plurality of paths outside of the tunnel proper through which tunnel atmosphere may be passed from one of said zones to the other, means individual to said ducts for producing downdraft therein, fireboxes individual to and in draft connection with the inlet end of said ducts, whereby said draft producing means may draw firebox gases into the inlet end of the ducts, said fireboxes being mounted along the roof of the tunnel.

2. Annealing apparatus according to claim 1, wherein said draft connection comprises a downcomer passage into the upper end of which atmospheric air may enter through a valve-controlled inlet.

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3. Annealing apparatus according to claim 1, wherein said draft connection comprises a passage on which the duct inlet faces and whose lower end is open to the upper zone of said tunnel.

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