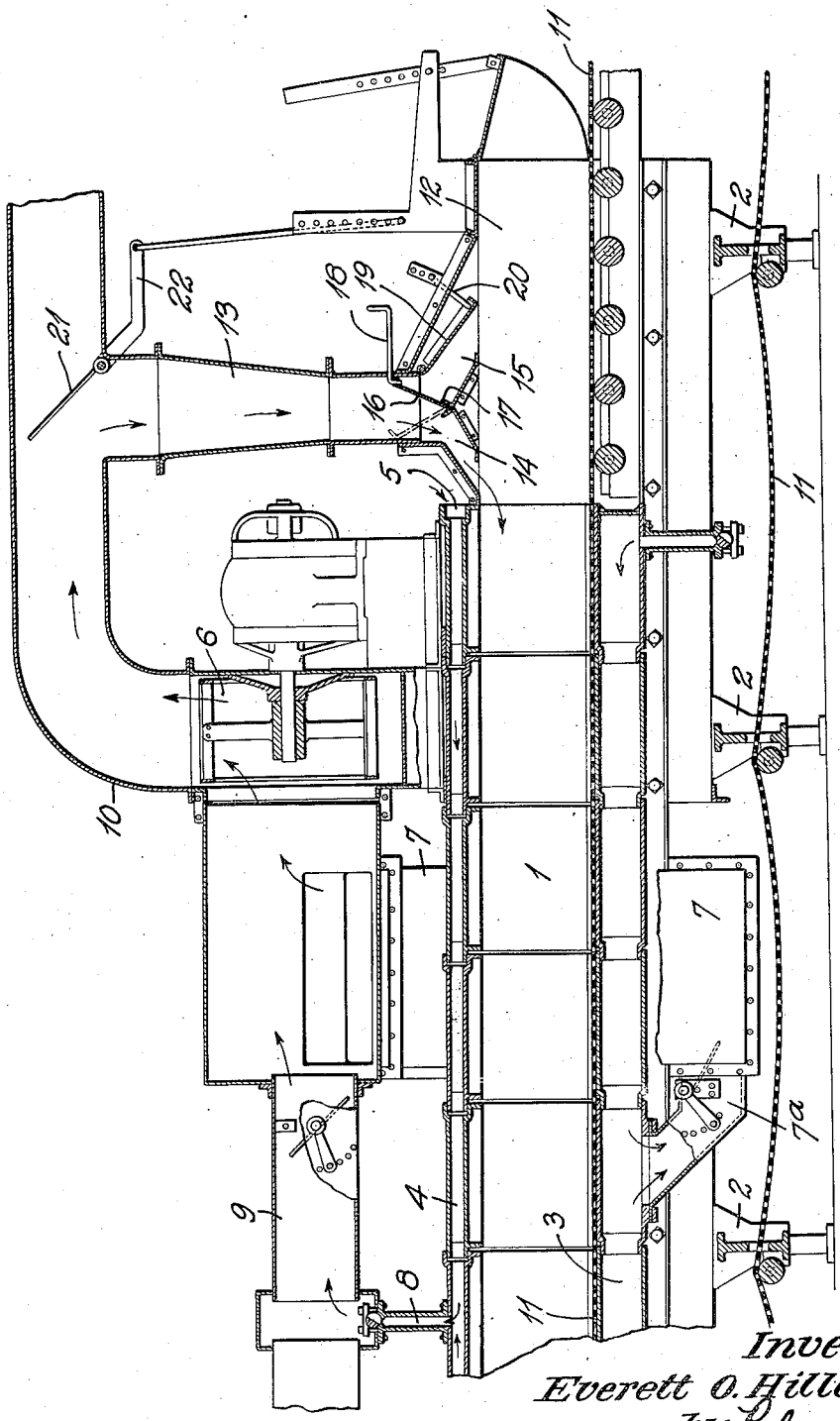
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APPARATUS FOR ANNEALING GLASSWARE

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APPARATUS FOR ANNEALING GLASSWARE.

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This invention relates to apparatus for annealing glassware, and it has particular relation to lehrs of the type embodying a tunnel through which a series of articles of glassware are transported, and in which they are annealed by being subjected to a succession of varying temperature environments in a predetermined order and relation, so as to relieve stresses and strains existing in the ware.

In some installations it has been found that an excessive differential air pressure exists at opposite ends of the lehr tunnel, so as to cause a tendency for air from the outer atmosphere to flow through or into the tunnel from either the discharge end or the receiving end of the tunnel, and thus to disturb the desired order or relation of the thermal conditions within the tunnel.

One of the objects of the present invention is to eliminate the difficulty above referred to by causing a counteracting current of air or other gases to flow in the tunnel in a direction opposite to that of the flow of the current that it is desired to overcome and which, while being of a force and volume sufficient to counteract such current, does not of itself develop a disturbing current for any appreciable distance through the tunnel.

Other objects will appear from the following specification and the appended claims.

The single figure of the accompanying drawing is a vertical longitudinal sectional view of the discharge end of a lehr embodying the invention.

Referring to the drawing, the invention is shown as being embodied in a lehr having a tunnel 1 supported upon pedestals 2. The articles of glassware to be annealed are transported through the tunnel by a conveyor 11 which is driven by any suitable mechanism, not shown. One or more heating flues 3 extend longitudinally below the tunnel and are supplied with heated gases from a fire box, not shown. One or more cooling flues 4 also extend longitudinally above the tunnel, the air entering these flues at 5. The hot gases and the cooling air are both drawn through their respective flues 3 and 4 by a motor-driven fan 6. This fan communicates with the heating flues 3 through a damper-controlled duct 7ª and through conduits 7, which extend vertically one at each side of the tunnel, and the fan also communicates with the cooling flues 4 through damper-controlled pipes 8 and a wind pipe 9. The hot gases and cooling air, after passing the fan 6, enter a stack 10.

The structure with which the present invention is particularly concerned includes a hood or casing 12 which is disposed adjacent to the discharge end of the tunnel and constitutes a prolongation thereof. The stack 10 communicates with this casing through a pipe 13 and through a plurality of nozzles 14 and 15 which are inclined in opposite directions longitudinally of the tunnel. A valve or damper 16 is provided in the lower portion of the pipe 13 between the nozzles 14 and 15 and may be swung by means of a handle 18, on its edges 17 or on any suitable hinge, between the full-line and dotted-line positions indicated in the drawing, in order to close one of the nozzles 14, 15 and open the other, so as to direct a current of gases from the stack 10 either in the direction of movement of the ware through the tunnel or in the opposite direction. The cross-sectional area of either of the nozzles 14, 15 may be varied by adjusting one of its walls as shown at 19 by means of a link connection 20.

A valve or damper 21 is provided in the stack 10 adjacent to the pipe 13 and may be adjusted by means of a lever 22 in order to deflect more or less of the gases traversing the stack 10 into the pipe 13.

In the event that atmospheric pressure at the receiving end of the lehr exceeds that at the discharge end thereof, there will be a tendency for a current of air to flow into the receiving end of the tunnel. In such event, the damper 16 will be moved to the position shown in full lines in the drawing, so as to direct a regulable quantity of the gases from the stack 10 through the nozzle 14 into the tunnel in a direction toward the receiving end, so as to counteract the tendency of the air to enter the receiving end. Conversely, if there is a tendency for air from the outer atmosphere to flow into the discharge end of the tunnel to an injurious extent, the valve 16 may be moved to the position indicated by dotted lines in the drawing, so as to direct the gases from the stack 10 through the nozzle 15 into the tunnel extension 12 and toward the discharge end of

the tunnel, so as to counteract the tendency for air to enter the discharge end of the tunnel.

The volume of gases thus introduced into the tunnel in either direction may be regulated by suitably adjusting the valve 21 and the velocity of the current issuing from the nozzle 14 or 15 may be increased or decreased, according to conditions, by increasing or decreasing the cross-sectional area of the nozzle by adjusting the position of the wall as at 19.

The invention may be applied to other types of tunnel lehrs, the counteracting air at a suitable temperature being derived from any convenient available source.

While I have shown and described the invention as being applied at the discharge end of the tunnel, where the ware has passed the critical stages of its annealing, it will be understood that, under some conditions, it may be found desirable to provide a draft-counteracting current, such as that described, at the entrance end of the tunnel. In this and in other respects the invention may be modified in construction, arrangement and mode of operation, without departing from the invention as defined in the appended claims.

I claim:

1. Apparatus for annealing glassware, comprising an annealing tunnel, means for directing a current of gaseous medium into said tunnel, and means for reversing the direction of flow of said current longitudinally of said tunnel to counteract other currents of air tending to enter the tunnel by reason of a differential atmospheric pressure at opposite ends of said tunnel.

2. Apparatus for annealing glassware, comprising a tunnel, means for transporting articles of glassware therethrough, means for directing a current of gaseous medium into said tunnel, and means for selectively causing said gaseous medium to flow in opposite directions in said tunnel.

3. Apparatus for annealing glassware, comprising a tunnel, means for transporting articles of glass therethrough, means for directing a current of gaseous medium into said tunnel, and means for selectively causing said gaseous medium to flow in the same or in an opposite direction with respect to that of the movement of the ware through said tunnel.

4. Apparatus for annealing glassware, comprising a tunnel, a flue associated with said tunnel, means for causing a temperature-controlling medium to flow through said flue, means for transporting articles of glassware through said tunnel, means for directing a portion of said temperature-controlling medium into said tunnel, and means for shifting the direction of flow of said medium longitudinally of said tunnel.

5. Apparatus for annealing glassware, comprising a tunnel, a flue associated with said tunnel, means for causing a heating medium to flow through said flue, means for transporting articles of glassware through said tunnel, means for directing a portion of said heating medium into said tunnel, and means for shifting the direction of flow of said medium longitudinally of said tunnel.

6. Apparatus for annealing glassware, comprising a tunnel, a flue associated with said tunnel, means for causing a cooling medium to flow through said flue, means for transporting articles of glassware through said tunnel, means for directing a portion of said cooling medium into said tunnel, and means for shifting the direction of flow of said medium longitudinally of said tunnel.

7. Apparatus for annealing glassware, comprising a tunnel, a plurality of flues associated with said tunnel, means for causing a heating medium to flow through one of said flues and a cooling medium to flow through another of said flues, means for transporting articles of glassware through said tunnel, means for directing a portion of said media into said tunnel, and means for shifting the direction of flow of said media longitudinally of said tunnel.

8. Apparatus for annealing glassware, comprising a tunnel, means for transporting articles of glassware therethrough, a casing disposed at the discharge end of said tunnel and forming a prolongation thereof, a nozzle for projecting a current of gaseous medium into said casing, and means for varying the cross sectional area of said nozzle.

9. Apparatus for annealing glassware, comprising a tunnel, means for transporting articles of glassware therethrough, a casing disposed at the discharge end of said tunnel and forming a prolongation thereof, a plurality of nozzles communicating with said casing and extending in opposite directions longitudinally of said tunnel, and means for selectively projecting a gaseous medium through one or the other of said nozzles.

10. Apparatus for annealing glassware, comprising a tunnel, a flue associated with said tunnel, means for causing a temperature-controlling medium to flow through said flue, a stack communicating with said flue, means for transporting articles of glassware through said tunnel, a casing disposed at the discharge end of said tunnel and forming a prolongation thereof, a plurality of oppositely-directed nozzles communicating with said casing, a pipe for establishing communication between said stack and said nozzles, and means for selectively directing a portion of the gaseous medium passing through said stack through one or the other of said nozzles.

11. In combination with a tunnel lehr, a

conduit means disposed adjacent to the outlet end of the lehr, blower means connected therewith and arranged so as to cause a flow of air through the conduit and longitudinally of said tunnel, and means for reversing the direction of flow of the air in said tunnel.

12. Apparatus for annealing glassware comprising a tunnel, and means for selectively producing a draft longitudinally in said tunnel in either direction.

13. Apparatus for annealing glassware comprising a tunnel, means located adjacent to one end thereof for causing a draft through said tunnel longitudinally thereof, and means for reversing the direction of said draft.

Signed at Hartford, Conn., this 29th day of June, 1926.

EVERETT O. HILLER.