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FURNACE

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Fig. 1.

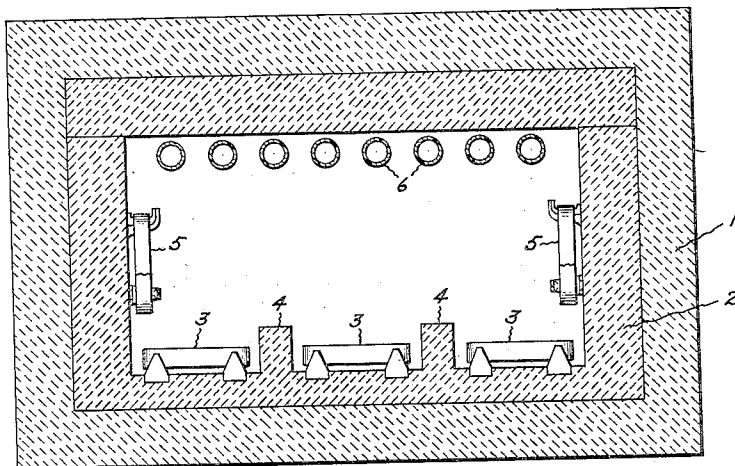
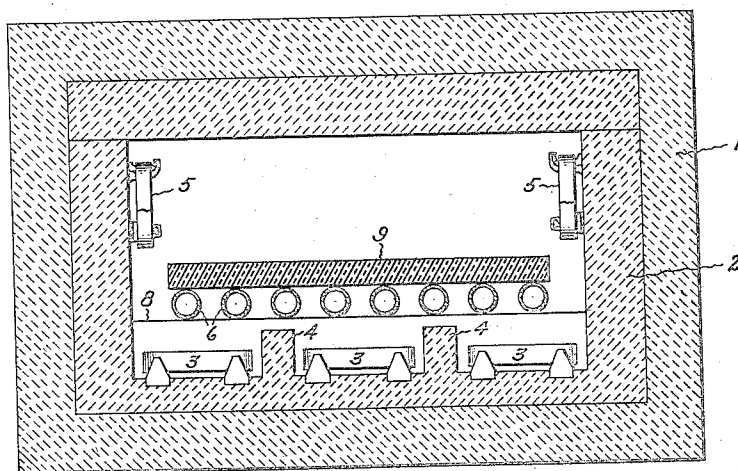


Fig. 2.



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3 Claims. (Cl. 263—3)

My invention relates to furnaces such, for example, as those which are employed for annealing purposes. It relates particularly to furnaces which are provided with ducts or tubes in which the material to be heated by the furnace is supported. With furnaces of this type heretofore constructed it has been found that as the cool material is drawn through a tube the lower side of the tube on which the material rests is cooled to a greater degree than the upper side and the resulting difference in temperature of the upper and lower sides of the tube has caused it to warp or bow upward in the middle. Such warping of the tube is objectionable for the reason that it increases the friction opposing the movement of the material through the tube and it subjects the tube to unnecessary stress which may cause a premature failure thereof.

It is the object of my invention therefore to provide a furnace having ducts or tubes for receiving material to be heated wherein the above mentioned objectionable warping or stressing of the tubes is greatly reduced if not entirely avoided.

In carrying out my invention in one form I provide means for supplying heat to the lower sides of the tubes at a more rapid rate than to the upper sides so as to compensate for the rapid withdrawal of heat from the lower sides by the articles being heated, whereby the temperatures of the upper and lower sides of the tubes are maintained substantially the same.

My invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 is a cross-sectional view of a furnace embodying my invention, and Fig. 2 is a similar view showing a modification.

In the form of my invention illustrated by Fig. 1 I have represented the furnace as comprising the rectangular enclosure 1, which may be composed of suitable heat insulating material and which also may be enclosed if desired in a metal housing, and an internal lining 2 of a more refractory heat insulating material. Within the furnace is a suitable source of heat, such for example as the electric heating units represented at 3, which are shown arranged on the bottom of the furnace to radiate their heat upwardly and separated by the usual refractory ribs 4. In addition to the heating units 3 I have shown other heating units 5 which are supported on the side walls of the furnace.

Close to the upper wall of the furnace are the tubes 6 through which the material to be heated by the furnace is adapted to be drawn. As shown in Fig. 1 the tubes 6 extend lengthwise of the furnace and are supported by the end walls thereof although additional intermediate supports may be provided if necessary. These tubes preferably are constructed of a suitable heat resisting alloy such as a nickel chromium alloy. As a result of arranging the tubes 6 adjacent the upper wall of the furnace substantially all of the heat is radiated to the bottom sides of the tubes, the upper wall of the furnace functioning as a blanket to limit the transfer of heat to the upper sides of the tubes. Hence as the relatively cool material to be heated by the furnace is drawn through the tubes the greater amount of heat transferred to the lower sides of the tubes compensates for the greater amount of heat withdrawn from the lower sides of the tubes by the material therein. As a result there is little or no tendency for the tubes to warp and the tubes are subjected to a minimum amount of strain due to temperature changes.

In the modified form of my invention illustrated by Fig. 2 the furnace construction is substantially the same as that shown by Fig. 1 except that the side heating units 5 are positioned somewhat higher in the furnace and the tubes 6 are positioned in the lower part of the furnace where they are shown resting upon piers 8. In this case I have provided the blanket 9 which overlies and is shown resting upon the tubes for retarding the flow of heat thereto. This blanket is composed of material, preferably in the form of bricks, which has suitable heat refractive and heat insulating qualities. The material also is relatively light in weight such that the blanket by reason of its weight alone is incapable of preventing the aforementioned objectionable upward bowing or warping of the tubes. Various materials having the desired qualities may be employed in the construction of the blanket such, for example, as a clay similar to that used in making well known fire brick to which has been added saw dust which burns out resulting in a porous material having a weight which may be only one fourth to one half of that of fire brick. As in the form shown in Fig. 1 the tubes 6 receive on their under sides the direct radiation from the heating elements 3 while the blanket 9 serves to limit the heat received by the upper sides of the tubes. As a result the upper and lower sides of the tubes are cooled substantially the same amount by the material being drawn there-

through wherefor they are less subject to warping and to stresses due to differences in temperature.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. A furnace having therein a source of heat and an open tube through which material to be heated is drawn, said tube being arranged above said source of heat and a body of light weight heat insulating material in said furnace arranged on said tube for retarding the heat flow to said tube.
2. A furnace having therein a plurality of heating units and a plurality of tubes extending there-
through for receiving material to be heated ar-

ranged above the heating elements and a blanket of light weight heat insulating material supported on said tubes.

3. A furnace having its walls lined with refractory material and having a plurality of heating units at the bottom thereof, piers in said furnace, a plurality of tubes through which material to be heated by the furnace may be drawn, said tubes extending through the furnace above said units and resting on said piers and a blanket of heat insulating material supported on said tubes, the weight of said blanket being insufficient in itself to prevent the upward bowing of the tubes.

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