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DRYING ARRANGEMENT SUCH AS A TUNNEL
KILN WITH TRANSVERSE CIRCULATION
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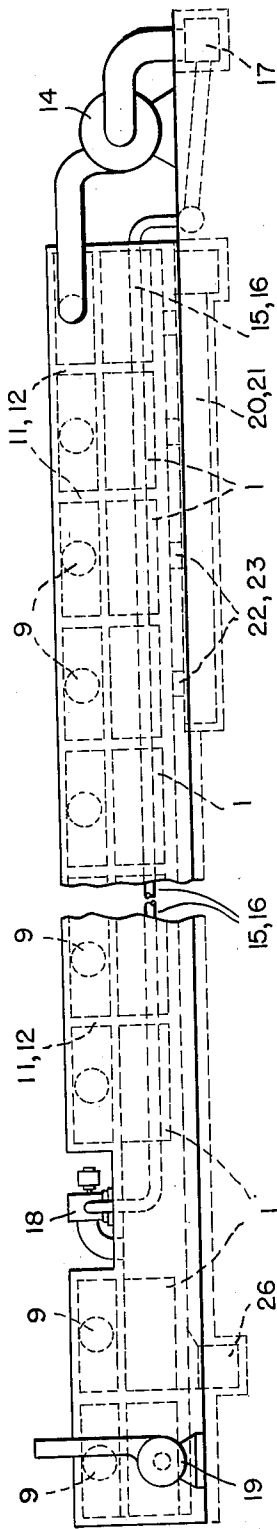


FIG. 2

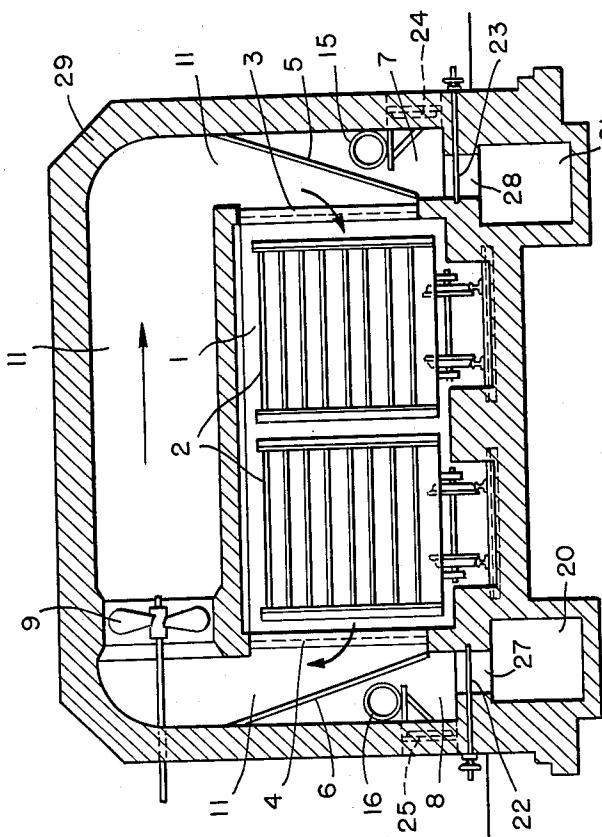


FIG. 1

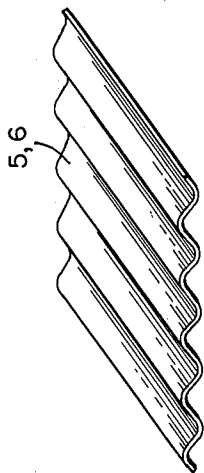


FIG. 3

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DRYING ARRANGEMENT SUCH AS A TUNNEL KILN WITH TRANSVERSE CIRCULATION

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6 Claims. (Cl. 34—212)

This invention relates to a drier such as a tunnel kiln with transverse circulation, consisting of a drying chamber and a room for the circulation of the drying medium such as air or other suitable gas by which the drying medium is passed over heating elements and this medium is distributed over the drying chamber as uniformly as possible.

A drying arrangement is known with transverse circulation in which the drying air is passed over heating elements placed in its passage and is conveyed past sloping baffles, before (and after) the drying chamber, the drying medium thus being distributed uniformly over the drying chamber and the side walls of this drying chamber being constructed of a material through which the drying medium can pass easily. This material may be a fabric with wide meshes or perforated plates.

Further a drying arrangement is known which, except the drying chamber itself, is divided into compartments by transversely arranged vertical partitions by which the transverse circulation is under better control. The heating elements may be heated by for instance steam or flue gases.

Also a tunnel kiln is known without transverse circulation in which the lower surface of the bottom of the drying chamber is heated by hot flue gases, which gases can enter in a controllable way under the bottom of the drying chamber by several openings provided with dampers longitudinally distributed over the length of the drying chamber; this tunnel kiln contains no sloping baffles as no transverse circulation takes place.

Heating elements arranged in the passage of the circulating drying medium in tunnel kilns with transverse circulation cause a relatively great resistance, and further when flue gases are applied these elements, having mostly a narrow passage for these flue gases, will be fouled quickly and are difficult to be cleaned.

The kiln with transverse circulation according to the invention comprises a drying chamber adapted for receiving therein the articles to be dried, a circulation chamber surrounding said drying chamber for transversely passing the drying medium into and from the drying room, said circulation chamber being provided with sloping baffles for conveying the drying medium smoothly and uniformly to said drying chamber and discharging said medium uniformly and smoothly from the drying chamber, said baffles also forming heating elements for the drying medium and which may be electrically heated or heated by steam, flue gases or other hot gases.

The transverse circulation is preferably augmented by dividing the circulation room into compartments by transversely arranged vertical partitions in said room.

The surface of the baffles may be increased for instance by corrugating the baffles, preferably so that the corrugations are transverse to the direction of the flow of the drying medium.

It is also advantageous to pass heated drying medium longitudinally through the tunnel kiln by admitting

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a supply of fresh drying medium, for instance at the end of the tunnel and removing used drying medium at the first part of the tunnel. If required and depending on the material to be dried and the condition of this material, a portion of passing drying medium may be withdrawn at a selected point of the tunnel kiln and re-cycled into the feed of fresh drying medium at the end of the drying kiln.

The accompanying drawing illustrates a now preferred embodiment of a tunnel kiln according to the invention.

Figure 1 is a vertical cross section of this tunnel kiln. Figure 2 is a vertical longitudinal section of this tunnel kiln, and

Figure 3 is a perspective view of one of the baffles of the kiln. The kiln, as shown in the figures, comprises a drying chamber 1 through which are passed the products to be dried, such as bricks, for instance in piles or on racks or conveying carriages 2. The side walls of the drying chambers may consist of the perforated plates 3 and 4. The blowers 9 direct the drying air along slanted and corrugated baffles 5 and 6, thus distributing the drying air uniformly over the drying chamber. The space for the drying air, except the drying chamber itself, is divided in compartments by the transversely arranged vertical partitions 11 and 12, effecting a transverse circulation of the air. The disposition of the partitions is clearly shown in Fig. 2.

Baffles 5 and 6 together with the wall of an outer housing 29 form spaces 7 and 8 heating gases through which, for instance flue gases, are conducted by which the baffles are heated so that they transmit their heat to the drying air. These flue gases are supplied to the spaces 7 and 8 from channels 20 and 21 through openings 27 and 28 distributed longitudinally over the tunnel kiln and fitted with dampers 22 and 23 by which the heating of the drying air can be controlled. This may be of advantage for instance when the temperature of the flue gases is lower than the starting temperature of the drying air flowing longitudinally through the kiln; in this case the flue gases are introduced at a distant point.

The flue gas spaces 7 and 8 can easily be cleaned by cleaning openings 24 and 25 provided with closing members. The flue gases are discharged through a channel 26.

A blower 14 feeds heated drying air from a channel 17 to the tunnel kiln for instance at one end of the tunnel. Recycled air can be directed by a blower 18 from a selected point, dependent on the products to be dried and their conditions, to channel 17 through conduit pipes 15 and 16, disposed in the flue gas spaces 7 and 8. The used drying air is discharged by the discharge blower 19 at the other end of the tunnel. The recycled air is reheated in the conduits 15 and 16 as this air, being withdrawn from the first parts of the tunnel, has mostly a low temperature.

What is claimed is:

1. A kiln for drying stock, comprising an elongated housing including transverse and longitudinal partition walls dividing the space within the housing in a longitudinal outer chamber transversely sub-divided in a plurality of compartments and a longitudinal inner chamber disposed within the outer chamber extending along the length of the housing and separated from the outer chamber by side walls and a top wall formed by the respective ones of said partition walls, the said inner chamber constituting a drying space for the stock to be dried, the side walls being formed with transverse passage openings connecting the inner chamber with said compartments, pairs of gas impervious deflectors, the deflectors of each pair being disposed in one of said compartments adjacent to opposite side walls of the inner chamber and slanted

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outwardly from the base of the respective side wall toward the juxtaposed housing wall to partition each of said compartments in an upper part and two lower parts, the latter being situated on opposite sides of the drying chamber, the upper part of each compartment forming a circulation path transverse to the housing and including the respective juxtaposed section of the inner chamber, blower means in the upper part of each compartment for circulating a gaseous drying fluid through said transverse circulation paths, the said passage openings and the said deflectors effecting a substantially uniform distribution of the transverse fluid flow through the respective section of the inner chamber, inlet conduit means communicating with an upper compartment part situated near one end of the housing for feeding a gaseous drying fluid into the said compartment part, outlet conduit means communicating with the upper part of a compartment situated near the other end of the housing for discharging the drying fluid from said latter compartment part after the fluid has traversed all the upper compartment parts intermediate of the inlet and the outlet compartment part respectively and the inner chamber, and reflux conduit means connecting the outlet conduit means with the inlet conduit means for refluxing discharged drying fluid through the housing.

2. A kiln according to claim 1, wherein the said deflectors comprise gas impervious plates corrugated in vertical direction.

3. A kiln according to claim 1, wherein a duct for hot gaseous fluid extends beneath all the lower parts of the compartments on each longitudinal side of said inner chamber, each of said ducts including a plurality of branch ducts each communicating with one of the lower compartment parts for heating the said compartment parts and the deflectors.

4. A kiln according to claim 3, wherein the said reflux conduit means are disposed within said lower compartment parts for heating the fluid refluxed through the said conduit means.

5. A kiln according to claim 4 and further comprising adjustable control means fitted in said branch ducts for controlling the flow of heating fluid through said branch ducts into the lower compartment parts.

6. A kiln for drying stock, comprising an elongated

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housing including partition walls dividing the space within the housing in a longitudinal outer chamber and a longitudinal inner chamber disposed within the outer chamber and separated therefrom by side walls and a top wall formed by said partition walls, the said inner chamber constituting a drying space for the stock to be dried, the said side walls being formed with transverse passage openings connecting the inner chamber with the outer chamber, gas impervious deflectors disposed in the outer chamber adjacent to the opposite side walls of the inner chamber and slanted outwardly from the base end of the respective side wall toward the juxtaposed housing wall to partition the outer chamber in an upper part and two lower parts, said lower parts being situated on opposite sides of the inner chamber, the upper part of the outer chamber forming circulation paths transverse to the housing and including the inner chamber, blower means in the upper part of the outer chamber for circulating a gaseous drying fluid through said transverse circulation paths, the said passage openings and the said deflectors effecting a substantially uniform distribution of the transverse fluid flow through the inner chamber, inlet conduit means communicating with the upper part of the outer chamber near one end of the housing for feeding a gaseous drying fluid into said outer chamber, outlet conduit means communicating with the outer chamber near the other end of the housing for discharging the drying fluid from the outer chamber, and reflux conduit means disposed within the housing and connecting the outlet conduit means with the inlet conduit means for refluxing drying fluid discharged from the outer chamber through the housing.

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