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- (72) Inventor DAVID JOHN CASWELL



(54) IMPROVEMENTS IN AND RELATING TO APPARATUS FOR DRYING CERAMIC ARTICLES

(71) We, CASBURY LIMITED, a British Company of Weston Coyney Road, Longton, Stoke-on-Trent, Staffordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to apparatus for drying ceramic articles, particularly but not exclusively articles of tableware.

According to the present invention there is provided apparatus for drying ceramic articles comprising first and second heating sections, means for transferring articles through said heating sections, a heat source provided in said first heating section for supplying radiant heat to exposed surfaces of the articles, means for varying the emissivity of the heat source, and means for directing jets of a heated gaseous medium in said second heating section towards the exposed surfaces of the articles.

Preferably the heat source comprises a plurality of heating stations and the transfer means is arranged to subject the articles to an indexing movement so as to have dwell periods.

Preferably also the indexing movement is such that the articles have a dwell period at each heating station. Also the indexing movement may be such that the articles have a dwell period between adjacent heating stations.

Advantageously the heating stations are defined by infra-red radiant elements.

Further means may be provided for recirculating air from the first heating section for use as the heated gaseous medium.

An embodiment of the present invention will now be described by way of example only, with reference to the accompanying drawing, the single figure of which is a diagrammatic illustration of an apparatus according to the invention.

Referring to the drawing, a tableware drying apparatus includes a casing (not shown) in which is provided an endless band conveyor 10 for transferring ceramic tableware articles, preferably six at a time across the width of the conveyor, through the casing. Within the casing there is provided a first heating section comprising a plurality of heating stations defined by variable emissivity, infra-red radiant elements 12, which can be individually controlled. The heating elements 12 are arranged above the conveyor 10 so as to radiate the heat on to the exposed upper surfaces of the tableware articles 14 which are carried on their moulds on the conveyor 10. The latter is subjected to an indexing movement so as to have a dwell period at each heating station and between adjacent heating stations.

A second heating section provided in the casing comprises a housing 16 located above the conveyor 10 and having a plurality of downwardly projecting jets 18. A fan 20 has its outlet communicating with one end of the housing 16 and its inlet communicating with a combustion chamber 22 of an induced draught suction burner 24. The fan 20 is operable by a suitable motor (not shown) to blow a gaseous medium, i.e. combustion products, from the chamber 22 into the housing 16.

For recirculating heated air from within the heating sections a first duct 28 is provided below the upper pass of the conveyor 10, the latter being perforated to allow the air to be drawn into the duct 28. A second duct 30 extends across the top of the heating sections in communication therewith and a branch duct 32 communicates between the ducts 28 and 30. The upper duct 30 opens into the combustion chamber 22, the fan 20 providing suction in the ducts. At the inlet end of the casing there is provided ducting 26 for releasing humidified air to the atmosphere. With such recirculation the burner 24 may only be required for temperature make-up purposes once the apparatus is operative.

To enable articles to be dried to a state whereby they can be demoulded and are suitable for edge-finishing, it is envisaged that a drying time of only 6—8 minutes will

be involved and this is a considerable saving in time over driers presently used.

In a modification, at the other end of the housing 16 adjacent to the first heating section, the housing 16 has an outlet arranged to face into the first heating section at a level above, but adjacent to the exposed surfaces of the articles 14. The hot combustion products are passed into the housing 16 and through the outlet at a reasonably high velocity through the first heating section so as to sweep over the exposed surfaces of the articles 14 and cause accelerated migration of moisture from the unexposed surfaces of the articles 14 to the exposed surfaces for rapid drying.

Various modifications may be made without departing from the invention. For example, although articles in the apparatus described are subjected to 50% drying by infra-red radiation and 50% drying by conventional jetting the apparatus is not restricted to such an arrangement.

Also, it is to be appreciated that the arrangement of the ducts is shown diagrammatically and can be altered to suit any design of apparatus. In particular the conveyor may transfer articles on both its upper and lower horizontally extending passes and may have vertically extending passes in which the articles can be loaded on, and moved from, the conveyor. The first heating section may be arranged at the lower horizontally extending pass of the conveyor with the heating elements therebelow, and the second heating section at the upper horizontally extending pass. The air recirculation is designed accordingly.

#### 40 WHAT WE CLAIM IS:—

1. Apparatus for drying ceramic articles comprising first and second heating sections, means for transferring articles through said heating sections, a heat source provided in said first heating section for supplying radiant heat to exposed surfaces of the articles, means for varying the emissivity of the heat source, and means for directing jets of a heated gaseous medium in said second heating section towards the exposed surfaces of the articles.

2. Apparatus according to claim 1,

wherein the heat source is positioned above the article transfer means.

3. Apparatus according to Claim 1 or 2, wherein the heat source comprises a plurality of heating stations and the transfer means is arranged to subject the articles to an indexing movement so as to have dwell periods.

4. Apparatus according to Claim 3, wherein the indexing movement is such that the articles have a dwell period at each heating station.

5. Apparatus according to Claim 3 or 4, wherein the indexing movement is such that the articles have a dwell period between adjacent heating stations.

6. Apparatus according to any of Claims 3 to 5, wherein the heating stations are defined by infra-red radiant elements.

7. Apparatus according to any of the preceding claims, wherein means are provided for recirculating air from the first heating section for use as the heated gaseous medium.

8. Apparatus according to Claim 7, wherein the heated gaseous medium is also provided by products of combustion from a burner.

9. Apparatus according to Claim 7 or 8, wherein the article transfer means comprises a perforated conveyor and said means for recirculating the air comprises a first duct which is located below the said conveyor and communicates with a second duct at the top of said first heating section, a fan being provided to provide suction in the ducts to recirculate the air.

10. Apparatus according to any of the preceding claims, wherein means are provided for passing the heated gaseous medium through said first heating section so as to sweep over said exposed surfaces of the articles and assist in drawing moisture from unexposed surfaces thereof.

11. Apparatus for drying ceramic articles substantially as hereinbefore described with reference to the accompanying drawing.

SWINDELL & PEARSON,  
Chartered Patent Agents,  
44 Friar Gate,  
Derby.

*This drawing is a reproduction of the Original on a reduced scale*

