Oct. 23, 1928. 1,689,082

T. H. RHOADS

PROCESS OF DRYING CERAMIC WARE AND APPARATUS THEREFOR

Filed March 13, 1924 3 Sheets-Sheet 1

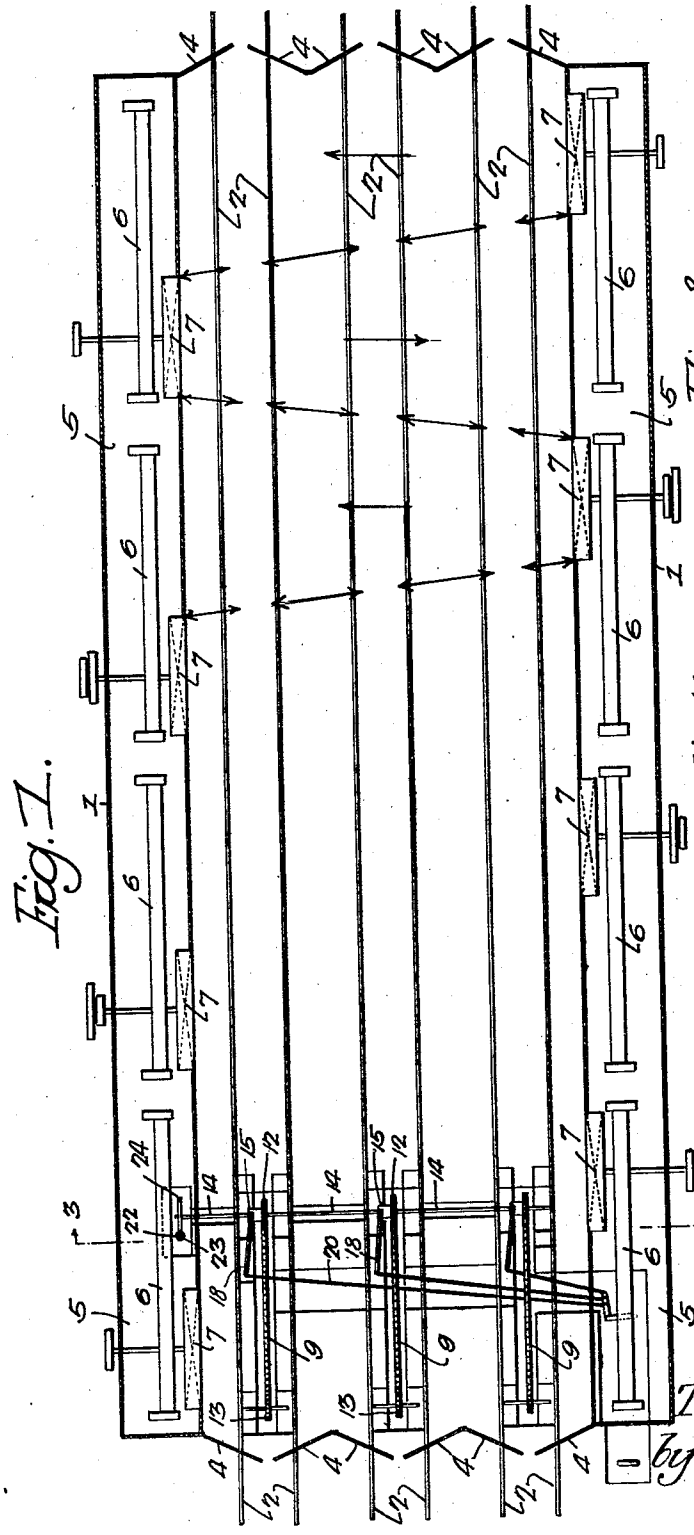


Fig. 1.

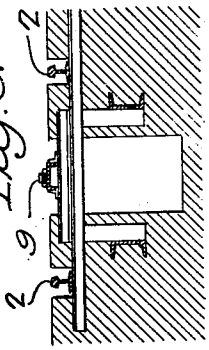


Fig. 8.

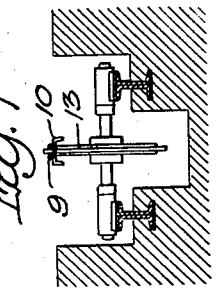


Fig. 7

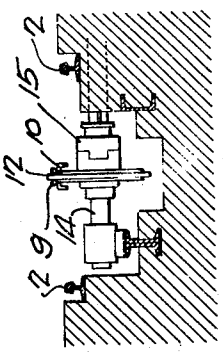


Fig. 6.

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Filed March 13, 1924 3 Sheets-Sheet 2

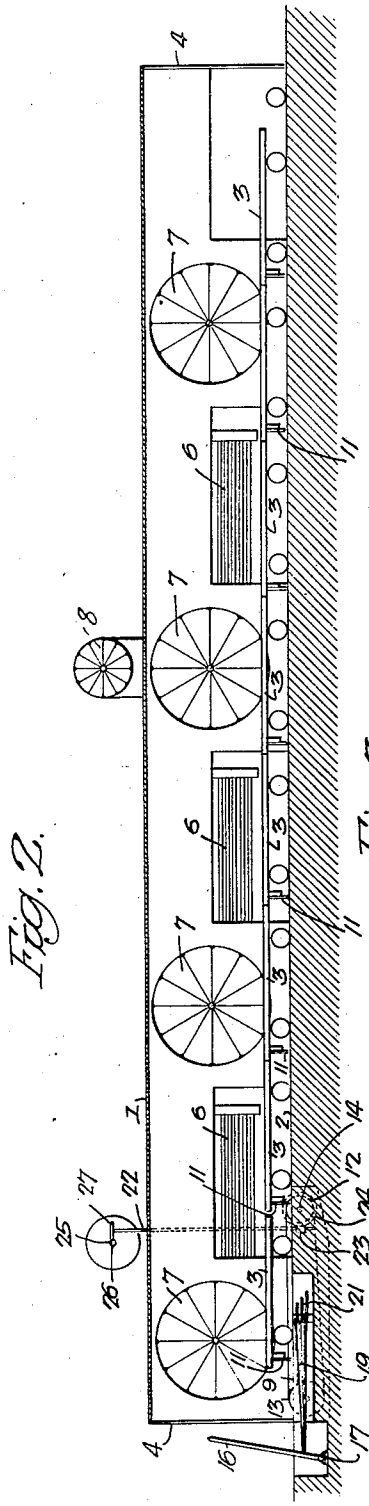


Fig. 2.

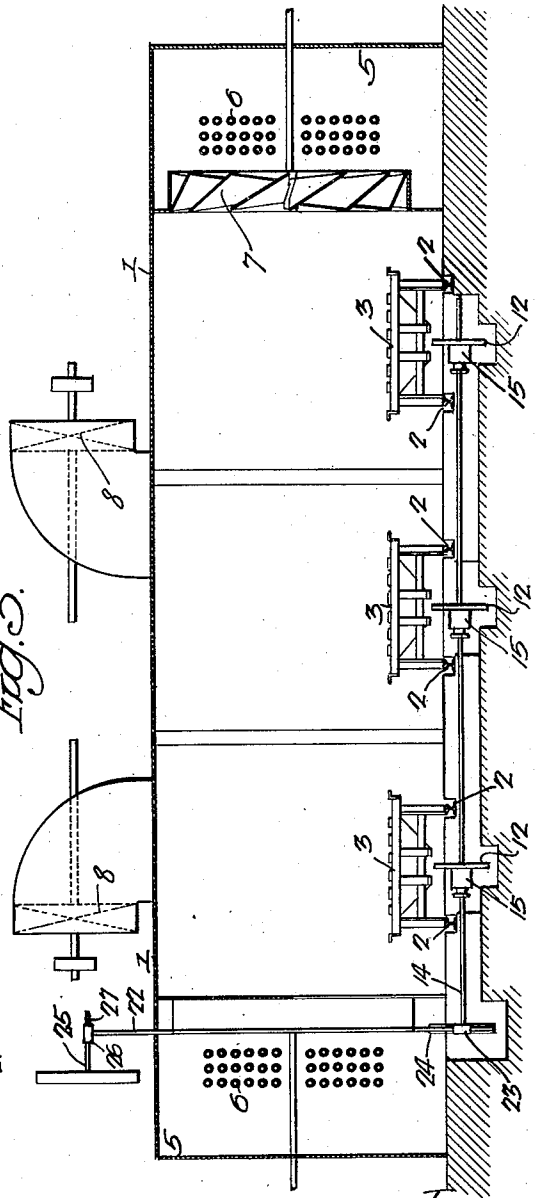


Fig. 3.

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PROCESS OF DRYING CERAMIC WARE AND APPARATUS THEREFOR

Filed March 13, 1924 3 Sheets-Sheet 3

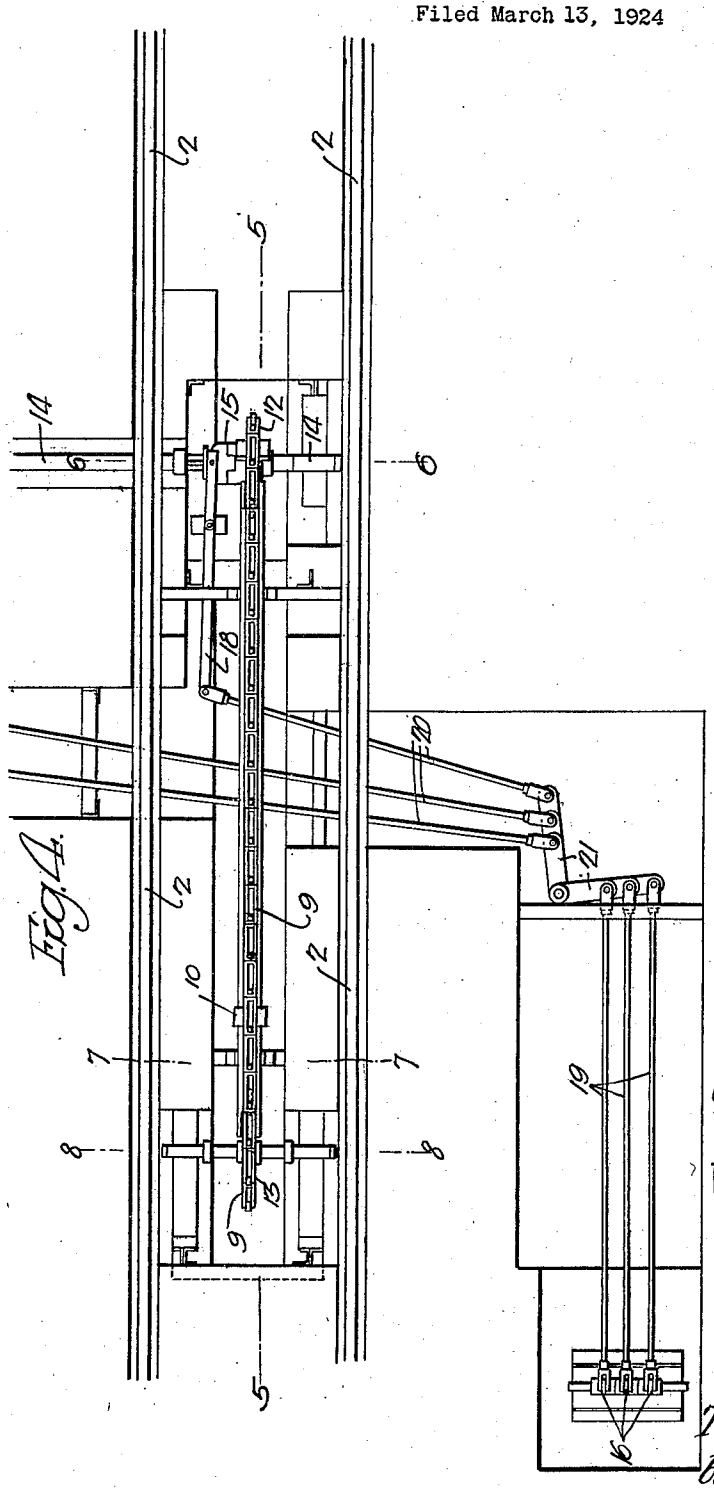


Fig. 4.

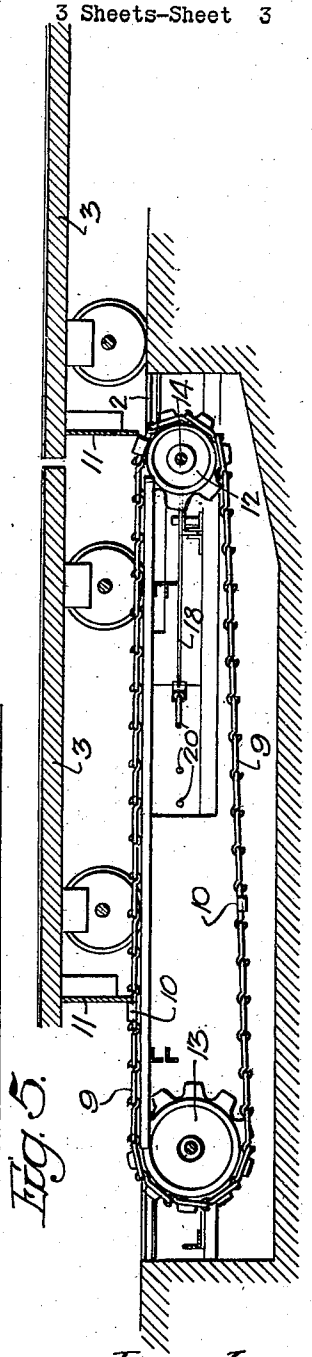


Fig. 5.

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Patented Oct. 23, 1928. 1,689,082

UNITED STATES PATENT OFFICE.

THOMAS H. RHOADS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO PROCTOR & SCHWARTZ, INCORPORATED, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PROCESS OF DRYING CERAMIC WARE AND APPARATUS THEREFOR.

Application filed March 13, 1924 Serial No. 698,901.

The object of my invention is to improve the process of drying ceramic ware in a drying chamber, in which air is circulated at different temperatures so as to eliminate strains due, ordinarily, to sudden changes in temperature, which cause cracks, or other imperfections, in the articles being dried.

This object I attain by gradually and uniformly increasing the temperature of the drying chamber from the inlet end to the discharge end thereof and causing the trucks carrying the ceramic articles to be moved continuously through the drying chamber at a slow speed so that the ware encounters a gradual change or increase in temperature as the ware progresses through the drying chamber.

In the accompanying drawings:

Fig. 1 is a sectional plan view of a drying apparatus embodying my invention;

Fig. 2 is a longitudinal sectional view;

Fig. 3 is an enlarged transverse sectional view on the line 3—3, Fig. 1;

Fig. 4 is an enlarged plan view of a detail of Fig. 1 illustrating one of the driving mechanisms;

Fig. 5 is a longitudinal sectional view on the line 5—5, Fig. 4;

Fig. 6 is a transverse sectional view on the line 6—6, Fig. 4;

Fig. 7 is a transverse sectional view on the line 7—7, Fig. 4; and

Fig. 8 is a transverse sectional view on the line 8—8, Fig. 4.

Referring to the drawings, 1 is the casing of a drying apparatus. In the present instance, three longitudinal tracks 2 are provided for trucks 3, on which the ceramic ware is loaded. At each end of the drier are doors 4 that can be closed after a truck is run into the drying chamber, or after a truck is withdrawn from the drying chamber.

At each side of the drying chamber are heating compartments 5, in which are located suitable steam coils 6 for heating the air in circulation to a proper degree. The respective steam coils 6 are so controlled and regulated as to heat the air circulating thereabout to different temperatures, these temperatures gradually increasing from the inlet end of the chamber to the discharge end thereof. 7 designate circulating fans, which are located in the longitudinal partitions that separate the heating compartments from the drying compartment, these fans being arranged in staggered relation along the partitions at opposite sides of the drying chamber throughout the entire length of the said chamber, and being adapted to create a plurality of independent currents of air at different places respectively along the drying chamber. Air is drawn by these fans 7 over and around the respective steam coils 6, which steam coils, as stated, gradually increase in temperature from the inlet end of the drying chamber to the discharge end thereof, and is projected transversely and in opposite directions into the drying chamber in a plurality of adjacent oppositely moving flows. The absence of any longitudinal partitions within the chamber or on the trunks supporting the ceramic or like wares, permits the adjoining portions of the adjacent air currents to blend with each other to gradually and uniformly increase the temperature of the air within the drying chamber from the inlet end to the discharge end thereof. Hence the continuously moving ceramic ware is at no time subjected to a decided or sudden change in temperature in passing from one transverse air flow to the next transverse air flow of higher temperature and the temperature throughout the entire length of the drying chamber will consequently increase gradually and uniformly from end to end of the chamber.

At a convenient point in the roof of the drier are one or more exhaust fans 8, which carry off the moist air. Wet and dry bulb thermometers are placed at suitable points throughout the length of the drying chamber.

The dry bulb and the wet bulb temperatures of the circulating air in the first compartment are the same as the temperature of the room in which the drier is located.

In order that the trucks may be fed forward continuously at a slow speed, endless drive chains 9 are located in the floor of the drier between the rails of each track. Each chain 9 has lugs 10 that engage a depending plate 11 on each truck 3, which moves the trucks forward. The chains pass around sprocket wheels 12 and 13. The wheels 12 are loose on a transverse driven shaft 14. Clutches 15 are provided for each sprocket wheel 12 so that any one of the three drive chains can be disconnected from the driving

mechanism when not in use. The clutches 15 are operated by three hand levers 16, which are pivoted at 17 and are connected to their respective clutch lever 18 by rods 19 and 20 and bell crank levers 21.

The shaft 14 is driven from a vertical shaft 22 through a worm 23 and a worm wheel 24. The shaft 22 is driven from a horizontal shaft 25, which is located above the drier, through a worm 26 and worm wheel 27. The shaft 25 is driven from a main counter shaft in any ordinary manner.

By this gear reduction, the drive chains 9 are driven continuously at a slow speed. In fact, the trucks travel a distance equal to their length in about three to five hours, according to the gearing. This slow movement of the trucks insures a gradual change in temperature as the ware progresses through the drying chamber. This eliminates any strains, which are due to sudden changes in temperature when the trucks are moved intermittently through the drying chamber, a distance equal to their length, in a short time, or, when the trucks are allowed to stand for a long period until the next move is made.

While a particular type of gearing is shown, other types may be used to obtain the desired result without departing from the main features of the invention.

One means of circulating the air in the drying chamber is shown. This means may be rearranged, or other means may be provided for circulating the air without departing from the essential features of the invention.

I claim:

1. The process of drying ceramic and like ware comprising the moving of said ware continuously through a single elongated drying chamber, creating a plurality of independent currents of air at different places respectively along the drying chamber, heating the air currents to different temperatures gradually increasing from the inlet end to the discharge end of the drying chamber, circulating the respective heated currents of air transversely of the drying chamber, and causing the adjoining portions of adjacent air currents to blend with each other, whereby the temperature of the drying chamber will uniformly increase from the inlet end to the discharge end thereof.

2. The process of drying ceramic and like ware comprising the moving of said ware continuously through a single elongated drying chamber, creating a plurality of independent currents of air at different places respectively along the drying chamber, heating the air currents to different temperatures gradually increasing from the inlet end to the discharge end of the drying chamber, circulating the respective heated currents of air transversely of the drying chamber, and causing the adjoining portions of adjacent air currents to blend with each other by causing adjacent air currents to flow in opposite directions across the drying chamber, whereby the temperature of the drying chamber will uniformly increase from the inlet end to the discharge end thereof.

THOMAS H. RHOADS.