P. JACKSON.

DRIER.

APPLICATION FILED APR. 7, 1911.

1,000,267.

Patented Aug. 8, 1911.

4 SHEETS—SHEET 1.

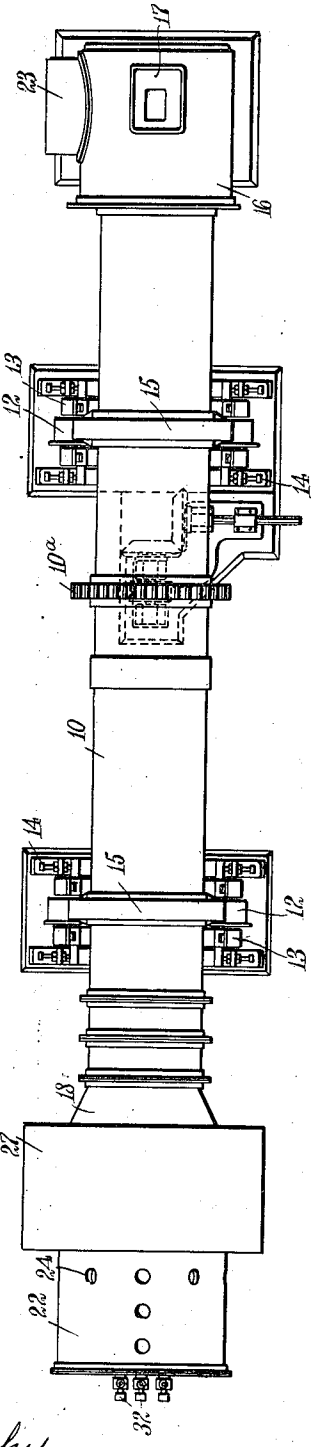

Fig. 1

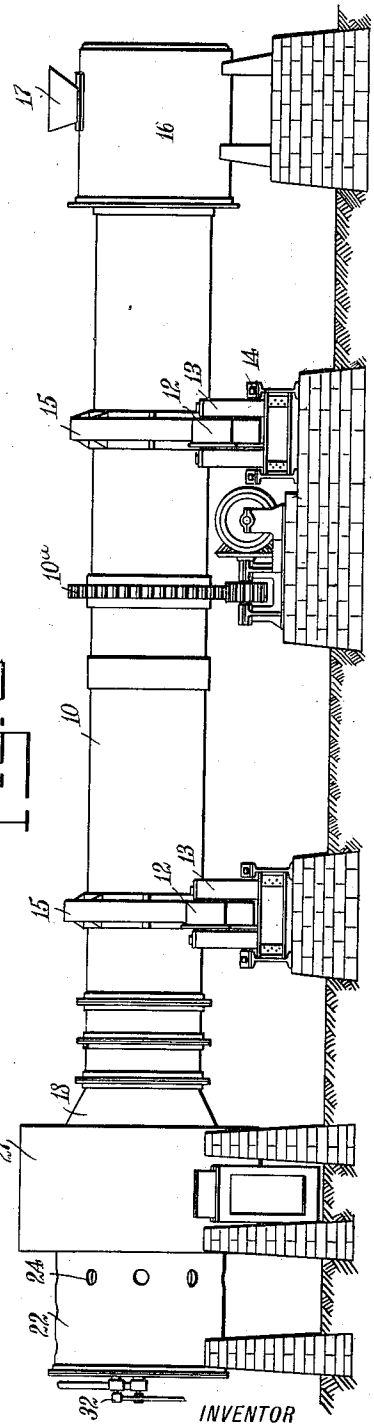

Fig. 2

WITNESSES:

J. A. Brophy

INVENTOR

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ATTORNEYS

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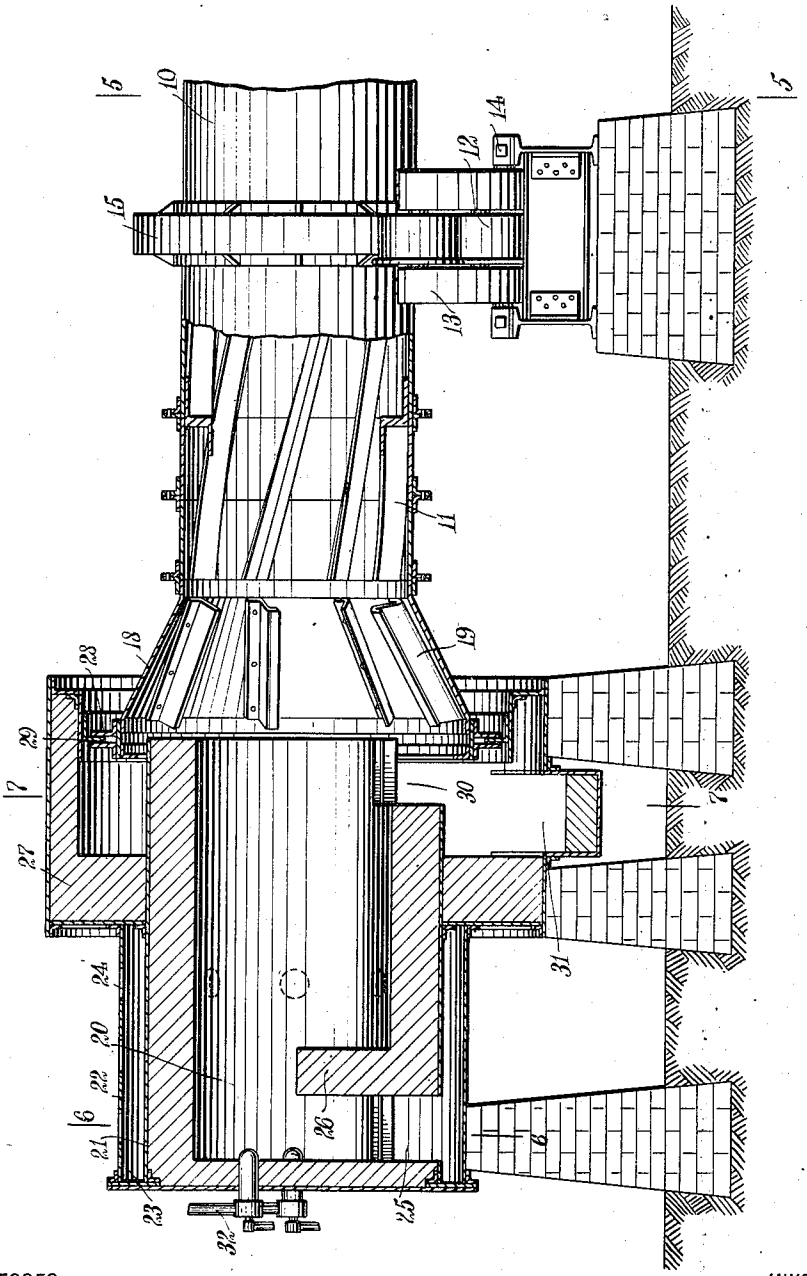
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 5

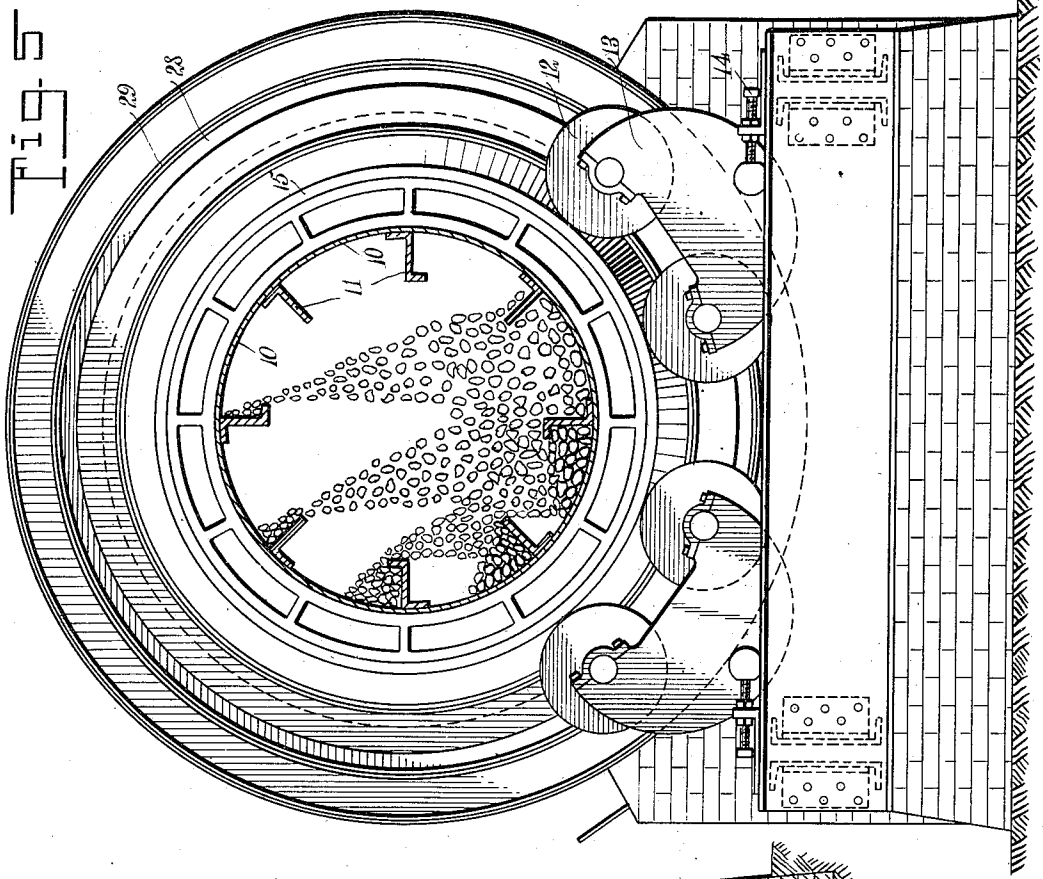
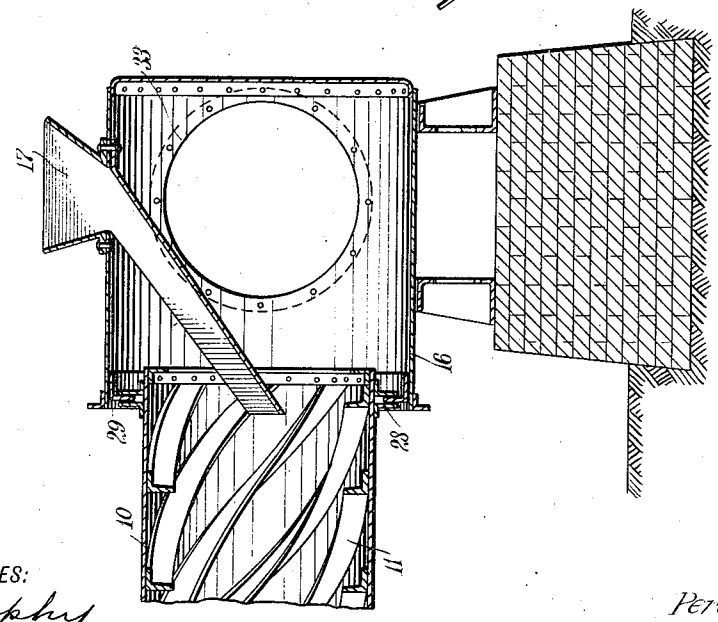


Fig. 4



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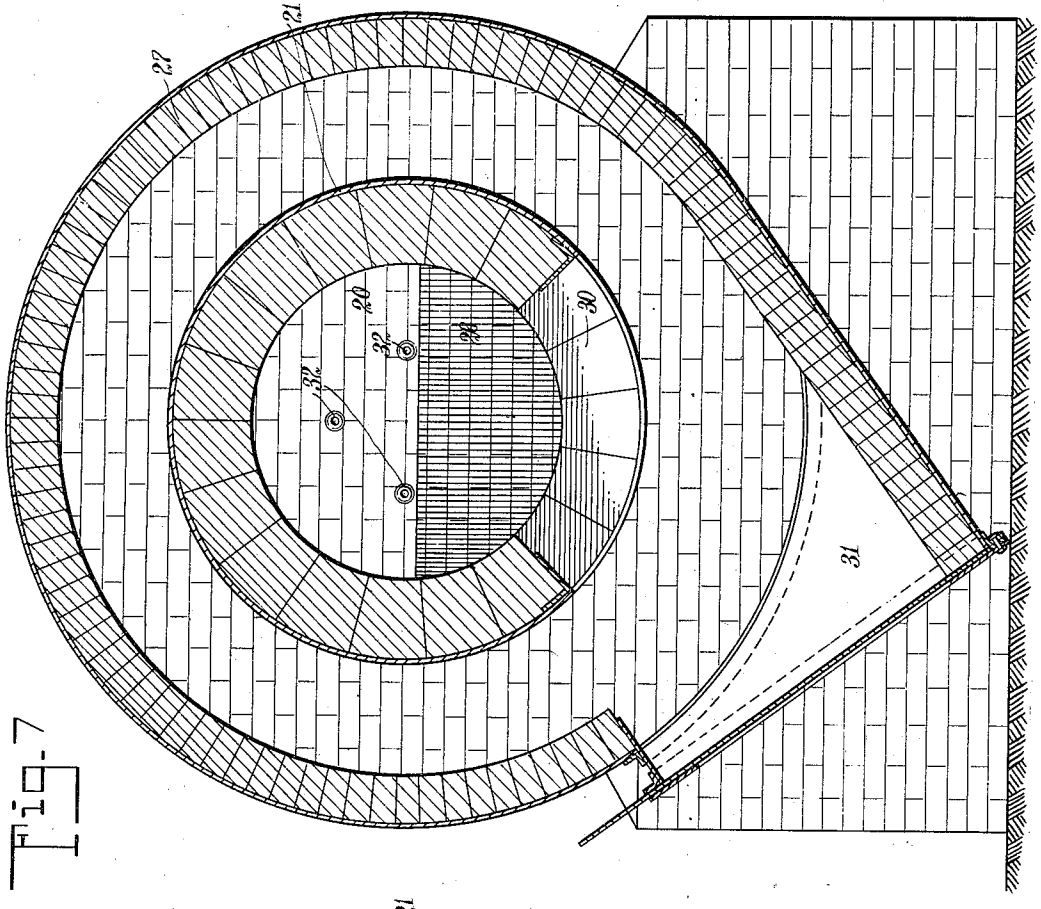

Fig. 7

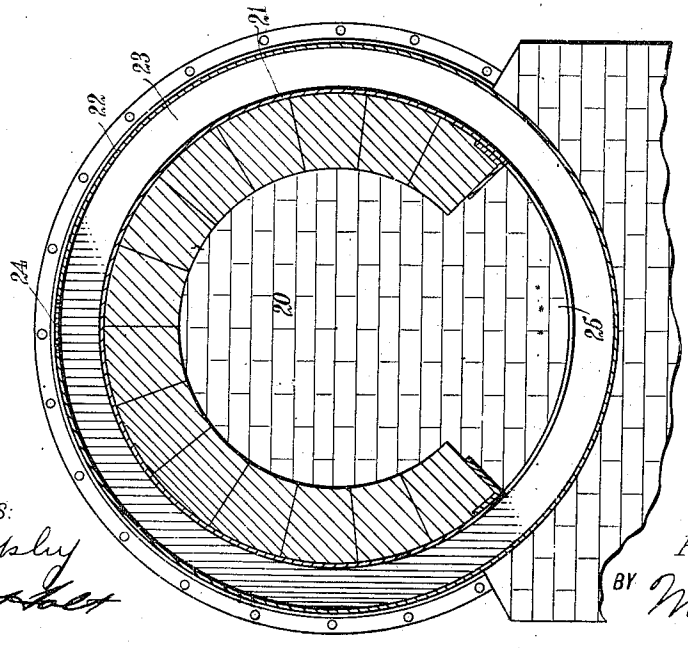

Fig. 6

WITNESSES:

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UNITED STATES PATENT OFFICE.

PERCY JACKSON, OF MACON, GEORGIA, ASSIGNOR TO J. S. SCHOFIELD'S SONS CO., OF MACON, GEORGIA, A CORPORATION.

DRIER.

1,000,267. Specification of Letters Patent. Patented Aug. 8, 1911.

Application filed April 7, 1911. Serial No. 619,532.

To all whom it may concern:

Be it known that I, PERCY JACKSON, a citizen of the United States, and a resident of Macon, in the county of Bibb and State of Georgia, have invented a new and Improved Drier, of which the following is a full, clear, and exact description.

The invention is an improvement in driers, relating primarily to driers embodying a rotary tubular conveyer, and has in view such an appliance in which the hot gases from a furnace are discharged through the conveyer in a direction opposite to the travel of the materials to be dried, the furnace and conveyer being arranged end to end, with the discharge end of the conveyer constructed to shower the said materials through the hot gases and flame of the furnace.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a plan of a drier constructed in accordance with my invention; Fig. 2 is a side elevation of the same; Fig. 3 is a central vertical section of the furnace and discharge end of the tubular conveyer; Fig. 4 is a similar section through the feed end of the conveyer and adjacent smoke box; Fig. 5 is a cross-section through the tubular conveyer on the line 5—5 of Fig. 3; Fig. 6 is a section on the line 6—6 of Fig. 3; and Fig. 7 is a section on the line 7—7 of Fig. 3.

In the construction of my improved drier I employ a relatively long tubular conveyer 10, having at the inner side thereof a series of spiral feed blades 11, the feed blades at the feed end of the conveyer having an inclination of about 45°, and gradually straightening toward the discharge end of the conveyer, at which point they are about 15° to the longitudinal axis. At suitable points in the length of the conveyer, ordinarily about one quarter its length from each end, the conveyer is revolubly supported on roller bearings 12, these bearings at each point of support, as best shown in Fig. 5, embodying a pair of rollers spaced apart and arranged on a carrier block 13 at each side of the conveyer, with the carrier blocks adjustable to and from each other by suitable means, such as the screws 14, which adapts the conveyer to be brought into proper alinement. At each point of support the shell of the conveyer is provided with an external bearing ring 15, which seats on the rollers. The power is shown to be applied to the conveyer by suitable gearing in driving engagement with a gear 10^a, surrounding a conveyer shell, the specific driving mechanism and the supports revolubly carrying the conveyer not forming a feature of my invention, but are illustrated for the purpose of making the operation clear.

The feed end of the conveyer projects into a smoke box 16, suitably supported and having a hopper 17 at the top discharging into the conveyer. The opposite and discharge end of the conveyer is of flaring or tapering form, as indicated at 18, with the tapered portion provided with showering blades 19, which, like the blades 11, are alternately L and Z-shaped, the blades 11 and 19 being shown arranged end to end.

A gas or oil furnace is suitably supported at the discharge end of the tubular conveyer, and comprises an inner combustion chamber 20 in axial alinement with the conveyer, the combustion chamber having an outer steel jacket 21, which is lined with fire-brick or fire-clay. A similar jacket 22 surrounds the body of the jacket 21 at the outer portion of the furnace and forms in connection therewith an annular air heating space 23, having the air inlet openings 24, the air heating chamber communicating with the combustion chamber through an inlet opening 25, extending upwardly from the bottom adjacent to the outer end wall. At the front of this opening a fire-back 26 is extended upwardly a substantial distance above the bottom of the furnace. The relative arrangement of the air intake openings and the inlet opening 25 is such that the air before gaining admission to the combustion chamber is enforced to travel around the chamber 23, where it is substantially heated. At the front of the packet 22 the furnace is provided with an enlarged shell 27, which, like the combustion chamber, is made up of an outer case or jacket lined with fire-brick or fire-clay, the shell being extended beyond the open end of the combustion chamber to receive the flaring discharge end of the tubular conveyer, the latter terminating relatively close to the combustion chamber, as clearly shown in Fig 3. An air-

tight joint is formed at each end of the tubular conveyer respectively between the smoke box 16 and the shell 27, by securing circumferentially around each of these points of the conveyer, flanges 28 spaced apart to provide an intermediate groove, the latter receiving a flange 29 slidably fitting and held against rotation within the adjacent stationary shell, which, at the feed end of the conveyer is the smoke box, and the discharge end the shell 27. The flanges 28 and 29 are ordinarily in the nature of angle-irons, which give them a substantial bearing surface on the parts on which they are carried. By thus constructing the joints at the ends of the tubular conveyer, the binding of the latter on the flanges 29 is prevented, the flanges moving slightly back and forth as the conveyer revolves. At the discharge end of the combustion chamber, which is at the mouth of the conveyer, a portion of the bottom wall is removed to provide a discharge opening 30 for the material dried, a pocket 31 being formed in the shell 27 below this opening, which shoots the dried material to one side of the drier (see Fig. 7), from which point it is suitably carried, as by a conveyer, to the point desired. In the outer end wall of the furnace, oil or gas burners 32 project into the combustion chamber above the fire back 26; and a smoke pipe 33 leads from the smoke box 16 and connects with a suitable stack.

In the operation of the drier, the material to be dried is fed into the hopper 17, and is transported through the tubular conveyer as the latter revolves, by the spiral feed blades. When the flaring discharge end of the conveyer is reached, the material is picked up by the blades 19 and is showered through the hot gases and flame passing out of the combustion chamber, and falls through the opening 30 into the discharge pocket 31. During the operation of the conveyer, the hot gases from the furnace are drawn therethrough by the stack from the smoke pipe 33, and effect the drying of the material, the heated gases traveling in one direction while the material travels in the opposite direction. Thus, the material is treated with the driest and hottest gases at the instant of discharge, and is subjected as they are fed in to the feed end of the conveyer, to the gases which have traveled the full length of the tube.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a drier, a furnace, and a rotatable tubular conveyer through which the gases of the furnace are discharged, and having its discharge end of enlarged and tapering construction and provided with blades whereby the materials to be dried are discharged by passing through the hot gases transversely to the direction in which the gases flow.

2. In a drier, a furnace having an approximately horizontally-disposed combustion chamber provided with an opening in the bottom thereof adjacent to its discharge end, and a rotatable tubular conveyer through which the gases of the furnace are discharged, having its discharge end of enlarged construction and provided with blades whereby the materials to be dried are discharged by being passed transversely through the direction of flow of the hot gases into the opening in the bottom of the said combustion chamber.

3. In a drier, an approximately horizontally-disposed combustion chamber open at its inner end and having an air inlet adjacent to the outer end thereof, an air heating chamber surrounding the outer portion of the combustion chamber and communicating with the air inlet, said air heating chamber having air intake openings removed from the said air inlet, an enlarged shell surrounding the forward portion of the combustion chamber, a tubular conveyer discharging at the open end of the combustion chamber and projecting into and having an approximately air-tight joint with the said shell, and a smoke box from which the conveyer leads, having a smoke pipe.

4. In a drier, a furnace having a combustion chamber approximately horizontally disposed, with the inner end of the combustion chamber open and the outer end provided with an air inlet opening adjacent to the inner wall, burners projecting through the outer wall of the furnace into the combustion chamber, an air heating chamber surrounding the combustion chamber, the heating chamber communicating with the air inlet, the heating chamber also having air intake openings remote from the said air inlet of the combustion chamber, and a revoluble tubular conveyer through which the heated gases from the combustion chamber pass, discharging at the open end of the combustion chamber.

5. In a drier, a furnace having an approximately horizontally-disposed combustion chamber open at the inner end and provided with a pocket arranged therebelow, and a revoluble tubular conveyer for the material to be dried, having its discharge end of enlarged and tapering formation and provided with blades, whereby the said material is discharged into the said pocket from an elevation, thereby passing it through the hot gases in a path transverse thereto.

6. In a drier, an approximately horizontally-disposed combustion chamber open at the inner end and provided with an air intake opening at the bottom adjacent to the outer wall thereof, a fire-back extending upwardly within the combustion chamber at

the front of the said opening, a heating chamber surrounding the combustion chamber and communicating with the said air intake opening, the wall of the heating chamber being provided with an air inlet remote from the said air intake, a furnace discharging into the combustion chamber over the said opening and above the fire-back, a shell arranged about the open end of the combustion chamber, a smoke box having a smoke pipe, and a rotary tubular conveyer extending from the smoke box to the open end of the combustion chamber, with the discharge end of the conveyer having an approximately air-tight joint with the shell and arranged to shower the material at the front of the said chamber.

7. In a drier, a furnace having a combustion chamber open at the front, a shell surrounding the forward portion of the combustion chamber, a rotary tubular conveyer through which the heated gases from the furnace pass and discharging at the front of the combustion chamber, and a joint between the discharge end of the conveyer and the shell, having interfitting portions, one of which is slidable relatively to the shell.

8. In a drier, a furnace having a combustion chamber open at the front, a shell surrounding the forward portion of the combustion chamber, a rotary tubular conveyer through which the heated gases from the furnace pass and discharging at the front of the combustion chamber, flanges spaced apart and externally carried on the discharge end of the conveyer, and a flange slidably fitting within the shell and passing between the flanges of the conveyer and forming in connection therewith an approximately air-tight joint between the conveyer and the shell.

9. In a drier, a smoke box, a furnace having a combustion chamber and provided with a shell surrounding the forward portion of the said chamber, a rotary tubular conveyer extending from the smoke box and discharging at the front of the combustion chamber, the conveyer having flanges externally arranged and spaced apart at both its discharge and receiving ends, and flanges respectively slidably retained in the smoke box and the shell and extending between and forming in connection with the flanges of the conveyer, approximately air-tight joints therewith.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PERCY JACKSON.

Witnesses:
W. LAMAR WILLIAMS, Jr.,
L. R. JACKSON.