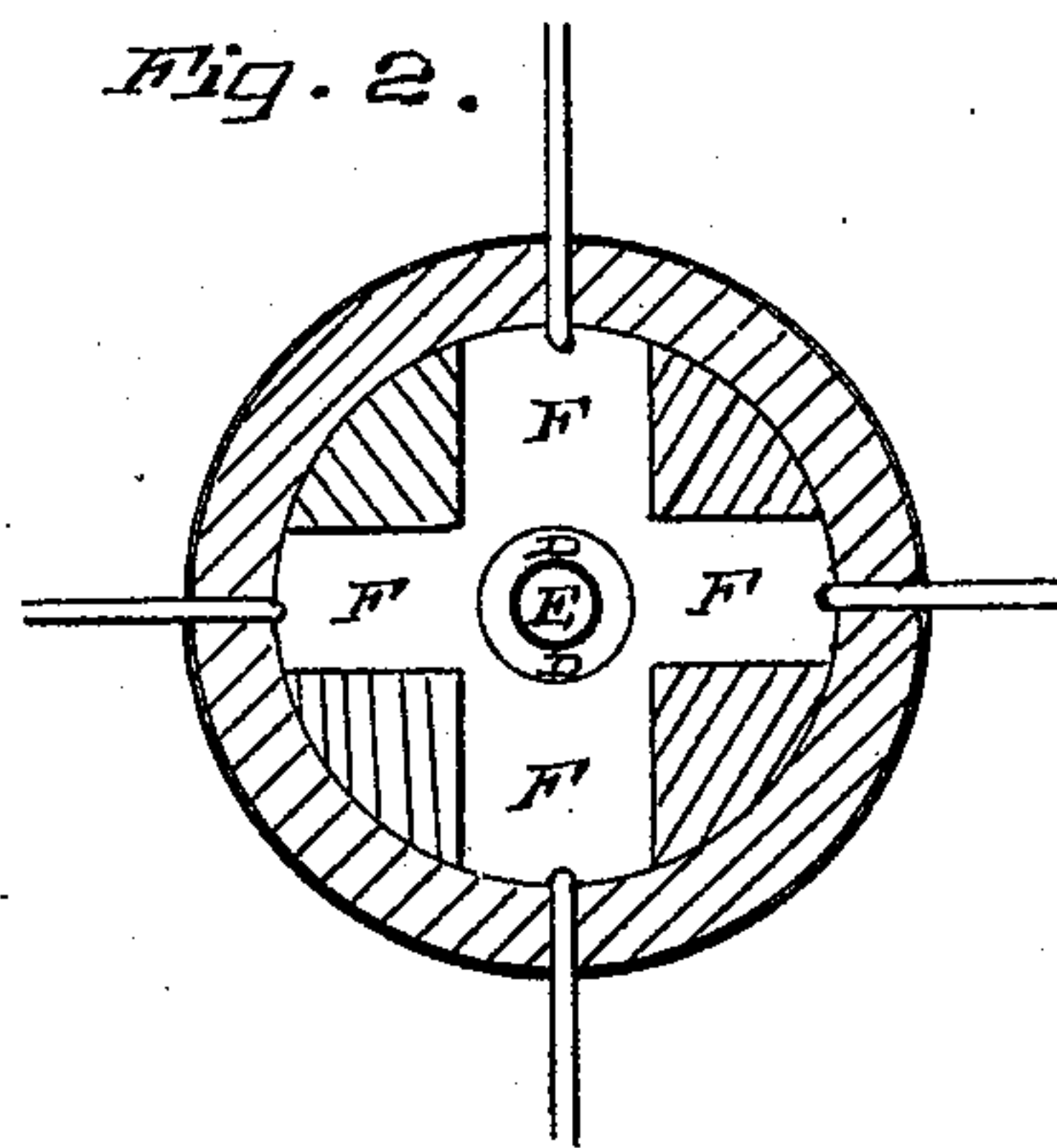
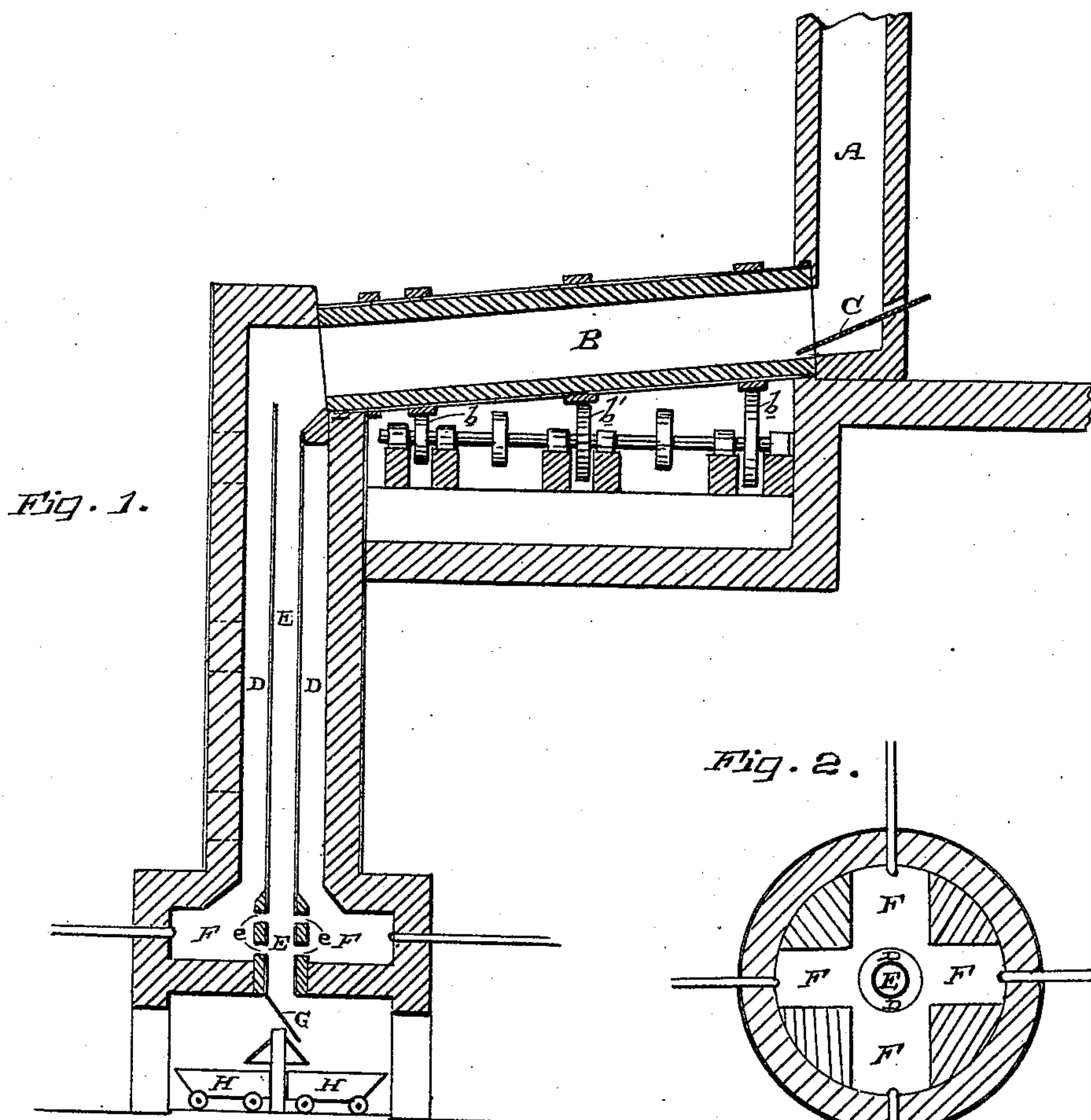
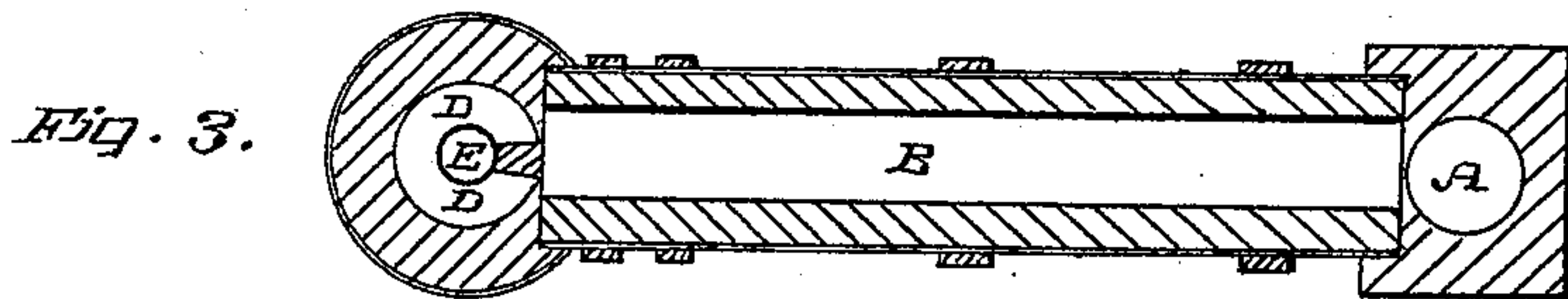


(No Model.)

W. JONES.  
LIMEKILN.

No. 437,494.

Patented Sept. 30, 1890.



Witnesses,  
Geo. H. Strong,  
J. H. House

Inventor,  
William Jones  
By Dewey & Co.  
attys



# UNITED STATES PATENT OFFICE.

WILLIAM JONES, OF SAN FRANCISCO, CALIFORNIA.

## LIMEKILN.

SPECIFICATION forming part of Letters Patent No. 437,494, dated September 30, 1890.

Application filed March 7, 1890. Serial No. 348,029. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM JONES, a citizen of Great Britain, residing in the city and county of San Francisco, State of California, have invented an Improvement in Limekilns; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of furnaces especially adapted for the burning of Portland cement clinker or other substances requiring a high degree of heat.

My invention consists in the novel constructions, arrangements, and combinations hereinafter fully set forth, and specifically pointed out in the claims.

The object of my invention is to provide a furnace for this purpose of a simple construction and effective in operation.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a vertical section of my furnace. Fig. 2 is a horizontal section through the fire-chambers. Fig. 3 is a horizontal section through the rotary cylinder.

A is the chimney.

B is an inclined revolving cylinder, one end of which is in communication with the chimney, said cylinder being mounted upon suitable anti-friction rollers, designated by *b*, and is driven by a gear mechanism *b'*.

C is a chute extending into and across the chimney and communicating with the upper end of the revolving cylinder.

D is the vertical furnace-shaft, the upper end of which is in communication with the lower end of the revolving cylinder.

E is an inner vertical tube within the furnace-shaft. The upper end of this tube is open, and is in such position as to receive the material from the lower end of the revolving cylinder.

F are the fire-chambers of the furnace, and into and through these the inner tube E passes, its lower end being open and communicating with a directing-plate G, by which the cars H are loaded. The inner tube E, within the fire-chambers, may or may not be perforated, as shown at *e*. Said tube E is made of any suitable sufficiently-refractory material, and is open from end to end, so that the material being burned passes completely through it.

The openings *e* within the fire-chambers are for the purpose of passing into the inner tube a part of the flame and draft.

The operation of the furnace is as follows: The material to be burned is formed by pug-mill and molding-machine or crushers into small pieces or balls, which are fed in through the chute C into the revolving cylinder B. In this cylinder they are moved gradually forward on account of the slope or inclination of the cylinder and its rotation, and in passing through it are dried and heated, the heat gradually increasing to the lower end of the cylinder. The heat is so regulated that the material is upon the point of clinkering when it reaches the outlet end of the cylinder; thence it falls into the vertical tube E, which is kept at the white heat necessary to perfect the burning or clinkering and out at the bottom of said tube, and by the plate G is directed into the receiving-cars.

I do not confine myself to the use of a single revolving cylinder, as a second one may be connected with the first for the purpose of more gradually heating the material.

As the slightly-varying percentages of carbonate of lime, iron, or alkalies in various Portland cement slurries affect somewhat the temperature at which they will clinker and the time they require to be exposed to the necessary white heat, the length of the furnace-shaft and the inner tube will vary for different materials. The balls or fragments of raw material will also vary from the size of peas to a larger size, according to the particular slurry being burned; but the shaft and the tube must be of sufficient length, and the draft must be so regulated as to give the necessary white heat and also to keep the small balls within the tube a sufficient time for thorough clinkering. The inner tube E is necessary, both by reason of the fact that it must be kept at a white heat, which would not be so well had in the furnace-shaft alone, and also because the draft through the furnace-shaft is so great as to render impractical any attempt to drop the fragments or balls of material directly through the shaft, but, being dropped through the tube, they are thoroughly clinkered and do not meet with the resistance of a great draft.

Having thus described my invention, what



I claim as new, and desire to secure by Letters Patent, is—

1. In a furnace for burning Portland cement clinker and other substances requiring a high temperature, the fire-chambers having the vertical shaft, and the open-ended tube within said shaft and through which the material to be burned is dropped, substantially as herein described.

2. In a furnace for burning Portland cement clinker and other substances requiring a high temperature, the combination of the fire-chambers, the vertical shaft communicating therewith, and the vertical open-ended tube within said shaft and passing through the fire-chambers, said tube having the openings in its sides within the fire-chambers, substantially as herein described.

3. A furnace for burning Portland cement clinker and other substances requiring a high temperature, consisting of the fire-chambers having the vertical shaft communicating with them, the vertical open-ended tube within said shaft passing through the fire-chambers and opening below, and the revolving cylinder

der communicating with the top of the shaft and adapted to discharge the material into the upper end of the tube within the shaft, substantially as herein described.

4. A furnace for burning Portland cement clinker and other substances requiring a high temperature, consisting of the combination of fire-chambers having a vertical shaft, the open-ended tube within said shaft and passing through the fire-chambers, said tube having openings in its sides within the fire-chambers, the revolving cylinder communicating with the top of the shaft and adapted to discharge its material into the open upper end of the tube within the shaft, the chimney at the end of the revolving cylinder, and the feed-chute for directing the material into said cylinder, substantially as herein described.

In witness whereof I have hereunto set my hand.

WILLIAM JONES.

Witnesses:

S. H. NOURSE,  
H. C. LEE.