

J. C. KUEBLER.
DRYING FURNACE.
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919,598.

Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.

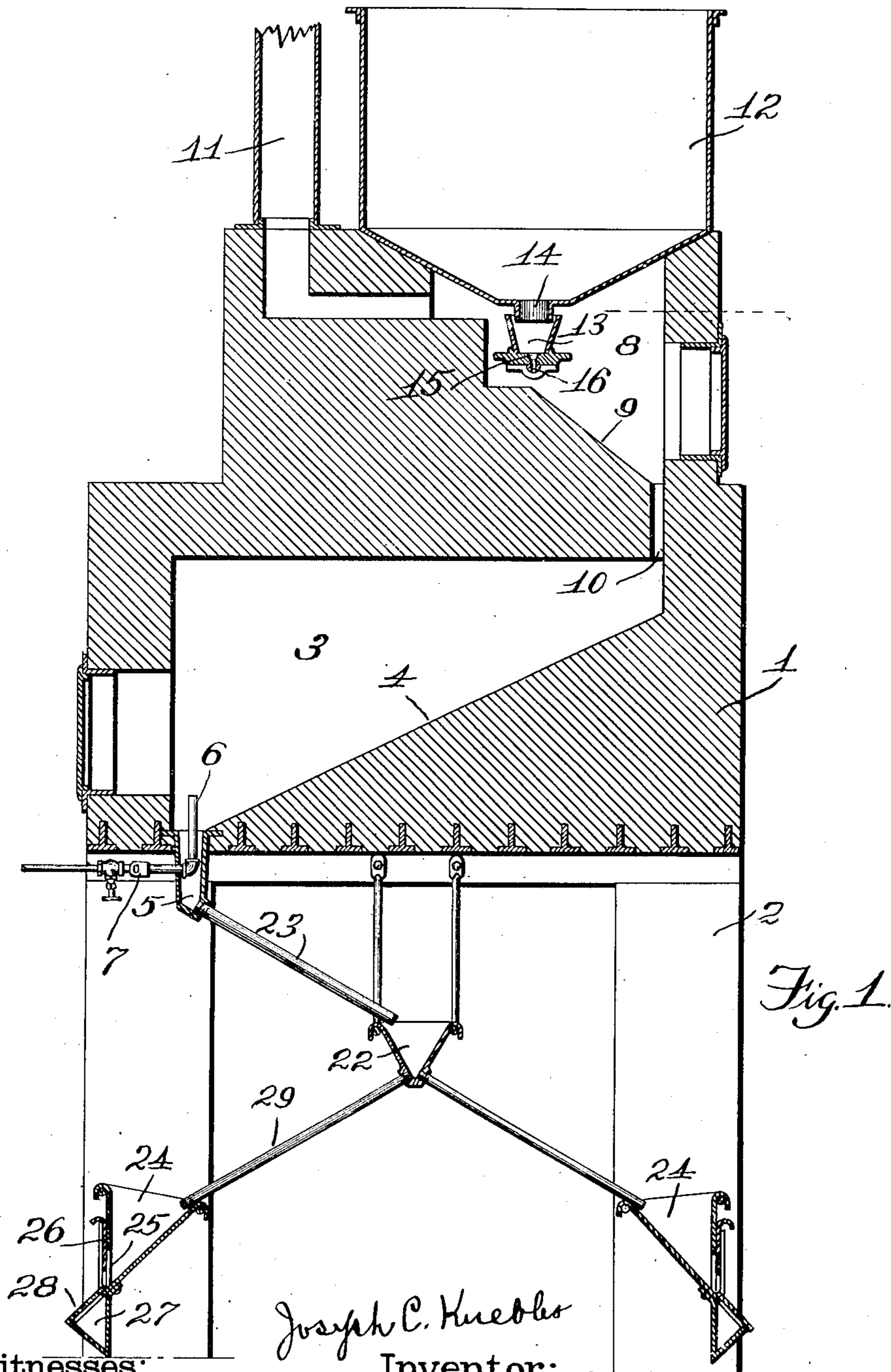


Fig. 1.

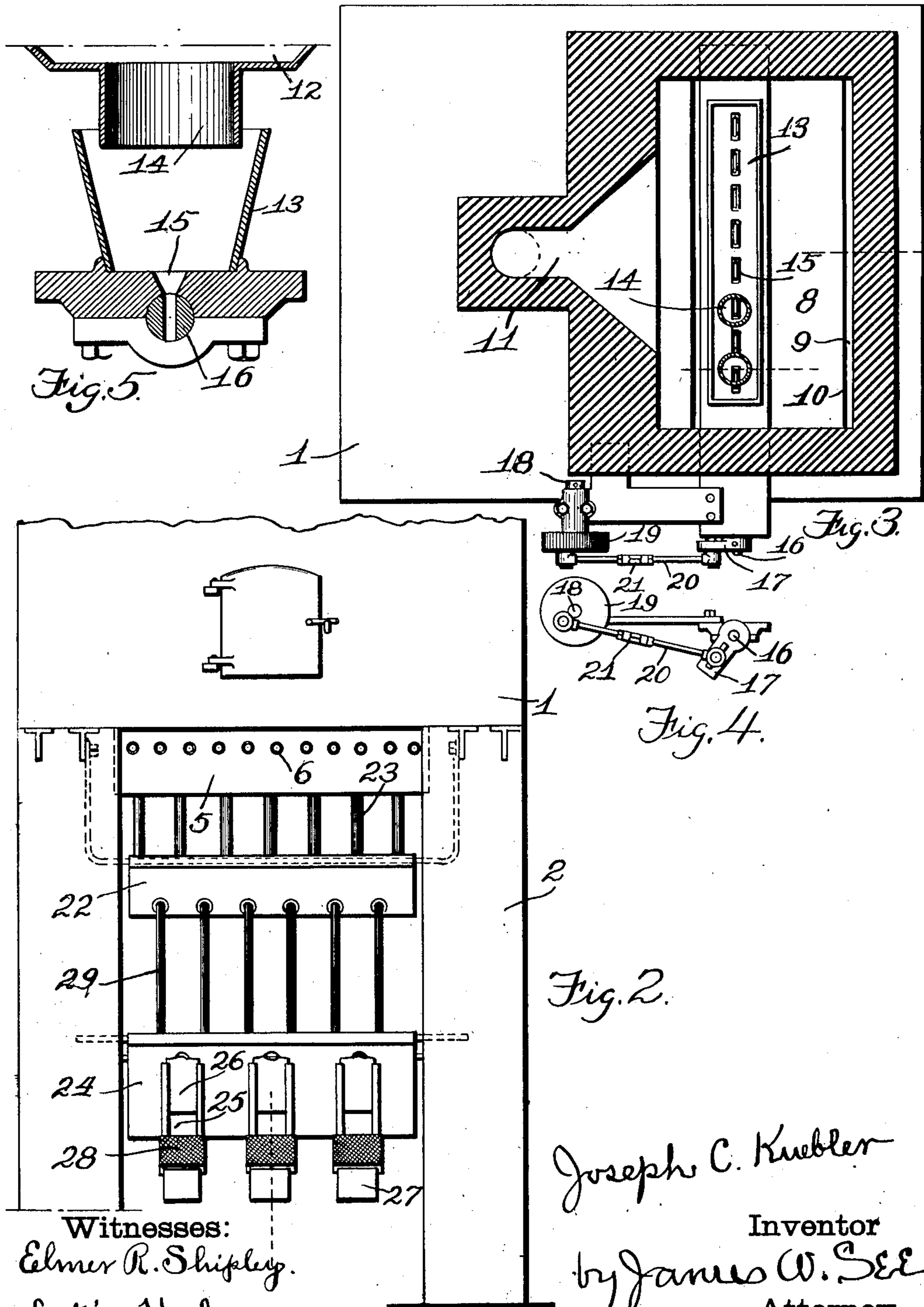
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UNITED STATES PATENT OFFICE.

JOSEPH C. KUEBLER, OF WELLSVILLE, NEW YORK.

DRYING-FURNACE.

No. 919,598.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH C. KUEBLER, a citizen of the United States, residing at Wellsville, Allegany county, New York, have
5 invented certain new and useful Improvements in Drying-Furnaces, of which the following is a specification.

This invention pertains to improvements in furnaces designed for the drying of granular material, bonedust as a mere example,
10 the main object being to produce an apparatus in which metal parts are kept out of contact with the more intense heat employed in the drying operation, and the invention
15 will be readily understood from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is a vertical section of a furnace embodying my invention: Fig. 2 a front
20 elevation of the lower portion thereof: Fig. 3 a horizontal section through the feed chamber: Fig. 4 a side elevation of the feeding mechanism: and Fig. 5 a transverse section, on an enlarged scale, of the feeder.

25 In the drawings:—1, indicates the body of the furnace, which is constructed of refractory material, as fire brick: 2, piers or legs supporting the same: 3, the combustion chamber: 4, the rearwardly inclined floor of
30 the combustion chamber: 5, a delivery trough extending across the combustion chamber at the base of the sloping floor thereof: 6, a series of gas burners disposed in the lowermost portion of the combustion
35 chamber, the flames of these burners being delivered at some distance up from the base of the combustion chamber, the illustration showing these burners as having their pipe work entering the furnace through the me-
40 dium of the delivery trough 5: 7, the mixers of the burners: 8, the feed chamber formed within the furnace over the combustion chamber: 9, a rearwardly declining floor for the feed chamber: 10, a slot extending from
45 the lowermost portion of the feed chamber down into the combustion chamber at a point over the highest portion of the sloping floor of the latter: 11, a flue leading from the feed chamber: 12, a supply hopper disposed
50 over the feed chamber: 13, a feed trough disposed within the feed chamber and under the feed hopper: 14, a series of nozzles in the floor of the feed hopper, these nozzles leading to the feed trough: 15, longitudinal slots in
55 the floor of the feed trough: 16, a rock-shaft disposed under the floor of the feed trough

and having diametrical slots to coincide with the slots 15, this shaft fitting up in a semi-circular recess in the lower surface of the floor of the feed trough so as to be capable of
60 acting valve-like on slots 15: 17, an arm on an end of shaft 16 projecting outwardly beyond a side of the furnace: 18, a crank shaft disposed parallel with feed shaft 16: 19, a
65 combined pulley and crank mounted on the crank-shaft 18: 20, a rod connecting the crank with arm 17, the connection of the rod with arm 17 being such as to permit of ad-
70 justment of the connecting point closer to or further from the center of rock-shaft 16: 21, a turnbuckle in rod 20 to permit of adjusting the length of that rod: 22, a receiving
75 trough disposed below the furnace: 23, a series of conducting tubes leading from delivery trough 5 to receiving trough 22: 24, a pair of secondary receiving troughs disposed one on each side and below the level of
80 trough 22: 25, outlet ports in the bases of the outer walls of secondary receiving troughs 24: 26, gates by which the outflow through these ports may be controlled: 27, a dust
85 pocket disposed below each of ports 25 in position to receive material flowing therefrom: 28, a sloping screen placed over the top of each of the dust pockets: and 29, conducting tubes leading from receiving
trough 22 to the secondary trough 24.

Assume the gas burners to be in operation and that the furnace is hot and that hot gases are passing through the combustion
90 chamber and feed chamber, the gases in the latter chamber being comparatively cool so that the metal therein is not liable to destruction. The material to be dried is kept supplied in supply-hopper 12 and tends to
95 flow out through the nozzles, the material lying on the floor of the hopper becoming more or less dried by contact with the bottom of the hopper. The material flows into
100 feed trough 13 and seeks to drop therefrom through the slots in the floor of the feed trough and in the rock shaft.

The rock-shaft can manifestly occupy an angular position completely preventing the
105 flow through the slots or, on the other hand, it may occupy an angular position permitting full flow through the slots, or the slots may be partially open. The crank operated mechanism oscillates the shaft so as to bring
110 about, at each turn of the crank, a more or less free opening for the downward flow of the material, and the adjustment of the

length of the rod and of the effective radius of arm 17 determines the degree to which the slots will be opened and, to some extent, the time during which a given degree of opening will be maintained. The result is that the quantity of material delivered into the feed chamber may be regulated, and the intermittency of flow, due to the rocking of the shaft has the effect of dropping a succession of masses to the sloping floor of the feed chamber.

The sloping floor 9 of the feed chamber is hot and the material dropped upon it from the feed trough slides down and leaves the feed chamber through slot 10, and as the material passes through slot 10 it passes through an ascending column of hot gases on their way from the combustion chamber to the feed chamber. Owing to the intermittency of the dropping of the material from the feed trough there may be a more complete exposure of the material to the hot gases than would be the case if the flow were continuous. The result is that the material reaches the combustion chamber 3 in a more or less dried condition.

The combustion chamber 3 has its floor very hot, and the material falling from the feed chamber through slot 10 slides down the hot floor of the combustion chamber and becomes thoroughly dried by reason of contact with that floor and by reason of exposure to the hot gases in the combustion chamber. The dried material leaves the combustion chamber through delivery trough 5 and passes through conducting tubes 23 to receiving trough 22 whence it passes through conductors 29 to secondary troughs 24. The material flows out of the secondary troughs through the gated ports and is to be received in cans or other vessels.

In case the material leaving the gated ports contains dust or fine material which it is desirable to intercept, the material flowing

from the gated ports is allowed to flow down over the screens 28, the dust or fine material going to the dust pockets, while the coarser material flows off of the screens and into the cans or other vessels. If the screening action is not desired then the screens may be covered.

I claim:—

1. A drying furnace comprising, a chamber having a sloping floor, a supply hopper thereover, outlets at the base of the hopper and over the higher portion of said floor, a slotted rock-shaft cooperating with the outlet and controlling the flow of material therefrom, mechanism for rocking said shaft, heating mechanism for maintaining heated gases within said chamber, and an outlet from the base of said chamber, combined substantially as set forth.

2. A drying furnace comprising, upper and lower chambers connected with each other and having sloping floors, gas burners in the base of the lower chamber, a flue leading from the upper chamber, means for delivering material upon the higher portion of the upper floor, and an outlet for the material at the lower portion of the lower floor, combined substantially as set forth.

3. A drying furnace comprising, a drying chamber having an outlet for the dried material, a receiving trough disposed below said chambers, conductors leading from said outlet to said trough, secondary troughs provided with outlet ports and gates, conductors leading from said receiving trough to the secondary troughs, dust pockets below the ports in the secondary troughs, and inclined screens over said pockets and in the path of material flowing from said ports, combined substantially as set forth.

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