

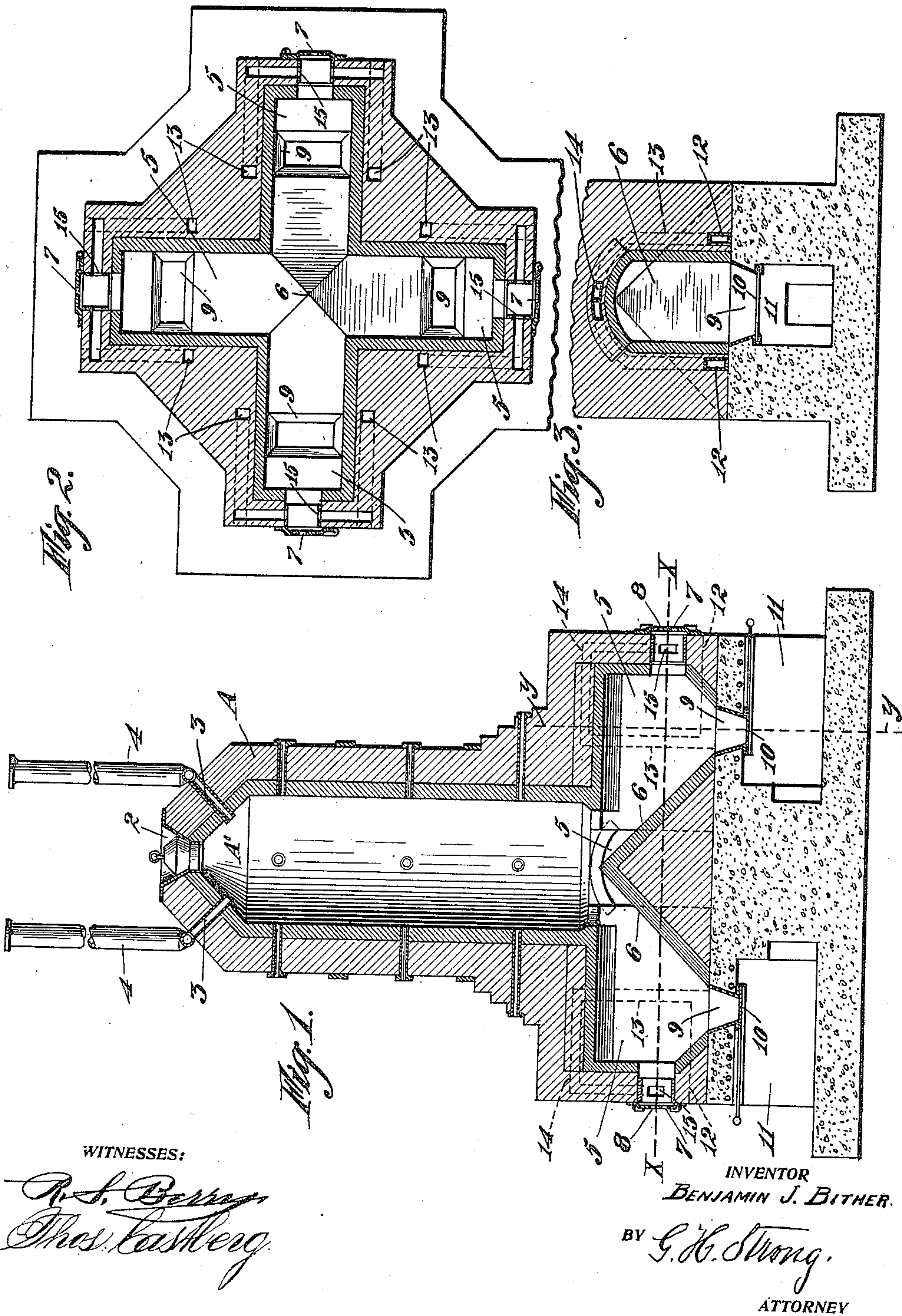
B. J. BITHER.

KILN.

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994,054.

Patented May 30, 1911.



WITNESSES:

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KILN.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, BENJAMIN J. BITHER, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Kilns, of which the following is a specification.

My invention relates to improvements in kilns for burning or calcining purposes, and particularly that class of kilns which are designed for burning lime, magnesite, or equivalent ores.

It consists in the combination of a vertical cupola, of parts and mechanism which are designed to facilitate the calcining and discharge of the material, the production of a hot air blast to unite with the fuel in the fire-box, and in details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is an elevation and partial section. Fig. 2 is a horizontal section on the line X—X of Fig. 1, showing the downwardly inclined planes, 6, in plan view. Fig. 3 is a vertical section on the line Y—Y of Fig. 1.

In the usual construction of lime and magnesite or like calcining kilns, it is common to fill the stack or cupola from an open top with the ore or material to be burned or roasted, and to discharge it directly through the bottom after being properly burned. It is difficult to direct the heat properly through the mass, and also to prevent it from clogging during its passage.

It is the object of my invention to provide a more perfect means of combustion, a means for confining the heat, and means for separating the ore at the bottom of the cupola, and delivering it downwardly and outwardly in the separated quantities, and to provide a plurality of discharging means, and a plurality of fire-boxes, with means for heating the air which is to be used in conjunction with the fuel.

The cupola A is of any suitable or convenient height, may be made of brick or other material, and lined with heat-resisting fire-brick or compound.

The top of the cupola is convergent, as shown at A', and is provided with a funnel-shaped feed opening 2 through which the material to be burned or calcined is delivered from time to time, and this opening may be provided with a suitable closure to

prevent the escape of heat and gases at this point.

3 are pipes or passages diverging through the inclined roof A', and connecting with discharge pipes or stacks 4 for the escape of the products of combustion, these pipes being of such diameter as to provide for a proper draft, without conveying the heat away with undue rapidity.

At the base of the cupola are arranged fire-boxes 5 which in the present case are designed for the combustion of fuel oil. I have shown four of these fire-boxes at right angles with each other. This base may be made octagonal, or of other suitable or desired shape, and built of concrete or other desirable material. It may also be recessed in the faces intermediate between the fire-box openings so as to reduce the amount of material necessary.

Directly beneath the cupola are outwardly diverging inclined planes 6, the apex of which is substantially central beneath the cupola, and the material as it passes down through the cupola is subdivided by this apex, and the separated portions will flow down the inclined planes 6 at the rear of the fire-boxes, so that the heat from the fire-boxes is first directed upon these subdivided portions, afterward passing up into the cupola, and through the mass of material which fills it. By this subdivision and separation of material, the tendency to fuse and bind together or stick in the cupola is to a great extent avoided, and the material will flow down with sufficient freedom, with little necessity for stirring it up. If however such necessity arises, there is an opening at 7, made in each of the fire-doors and peep-holes 8, in conjunction with said openings, so that the interior of each fire-box, and the material flowing down the plane which registers therewith, can be inspected through the peep-hole, and if occasion arises, a rod may be introduced through an opening 7 to stir and break up any mass which may have a tendency to stick. At the base of each incline is a discharge opening 9 which is closed by a sliding or equivalent door as at 10.

The main body of the kiln, and the fire-boxes, are set high enough so as to leave an ample space beneath in which chambers 11 are formed, and these chambers opening outwardly, admit of a car, wheel-barrow, or other conveyance which can be run in be-

neath the discharge passage 10, be filled with the burned or calcined material, and conveyed away without other handling, thus greatly reducing the labor.

5 The furnace as here shown is designed to use a liquid hydrocarbon fuel which may be introduced through any suitable burner.

In order to supply the proper draft of air I have shown air passages 12 which open
10 into the walls of the fire-box upon each side and near the bottom. These passages extend back to the rear of the fire-box, thence they extend upwardly on each side as shown at 13, and over the top of the arch of the
15 fire-box to passages 14, which return along the top of the arch to the front. From the front end of these passages, diverging passages extend outwardly and downwardly upon each side of the fire-box, as shown at
20 15, and the air is finally directed into the fire-boxes on each side from the passages 15. The flow of air through these heating passages is controlled by dampers of any suitable description, which may be located at
25 the inlet of the passages 12, or at other suitable point. I am thus enabled to gradually heat the air by the heat conducted through the walls of the fire-boxes, and the air thus heated, when injected into the furnace, is at
30 a high temperature and combines with the fuel to produce a sufficiently intense heat for the purpose. The combination greatly reduces the amount of fuel necessary, and makes the operation extremely economical.

35 Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. The combination in a calcining kiln, of

a vertically disposed cupola or stack, means
for delivering material to be calcined cen- 40
trally into the top of the cupola, gas discharge passages located around the inlet, said cupola being open at the bottom, a plurality of fire places located exterior to and
45 below the bottom of the cupola, inclined floors diverging from apices beneath the cupola base toward the fire places, and having discharge openings contiguous to said fire places, and receiving chambers with controlling gates disposed at the bases of the
50 inclines and contiguous to the fire places.

2. The combination in a calcining kiln, of a vertically disposed cupola or stack open at the bottom, a plurality of fire places located exterior to the bottom of the cupola, in- 55
clines diverging from the cupola base toward the fire places, an elevated base having chambers below the fire places, and discharge gates from the fire places to said chambers. 60

3. A calcining kiln comprising an elevated cupola or stack, a plurality of fire places spaced around, and exterior to the base of the cupola, floors having their apices united beneath the cupola and divergent down- 65
wardly and outwardly toward the fire places, chambers beneath the fire places, discharge passages from the fire places to said chambers, and gates therefor.

In testimony whereof I have hereunto set
my hand in the presence of two subscribing witnesses. 70

BENJAMIN J. BITHER.

Witnesses:

G. H. STRONG,
R. A. LEONARD.