

(No Model.)

J. F. DE NAVARRO.
APPARATUS FOR CALCINING CEMENT.

No. 531,742.

Patented Jan. 1, 1895.

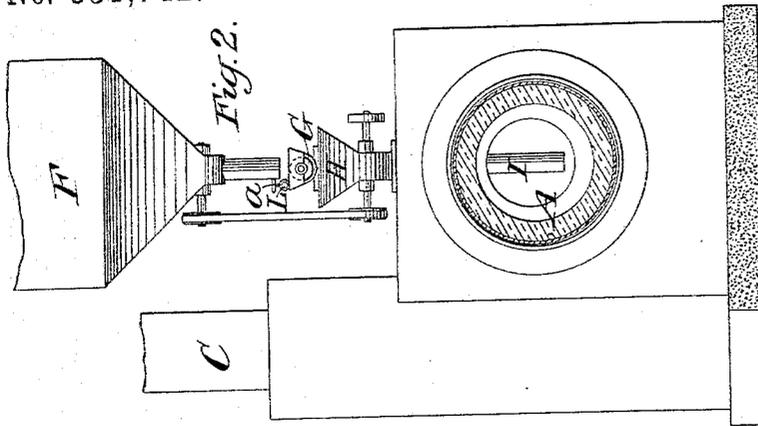


Fig. 2.

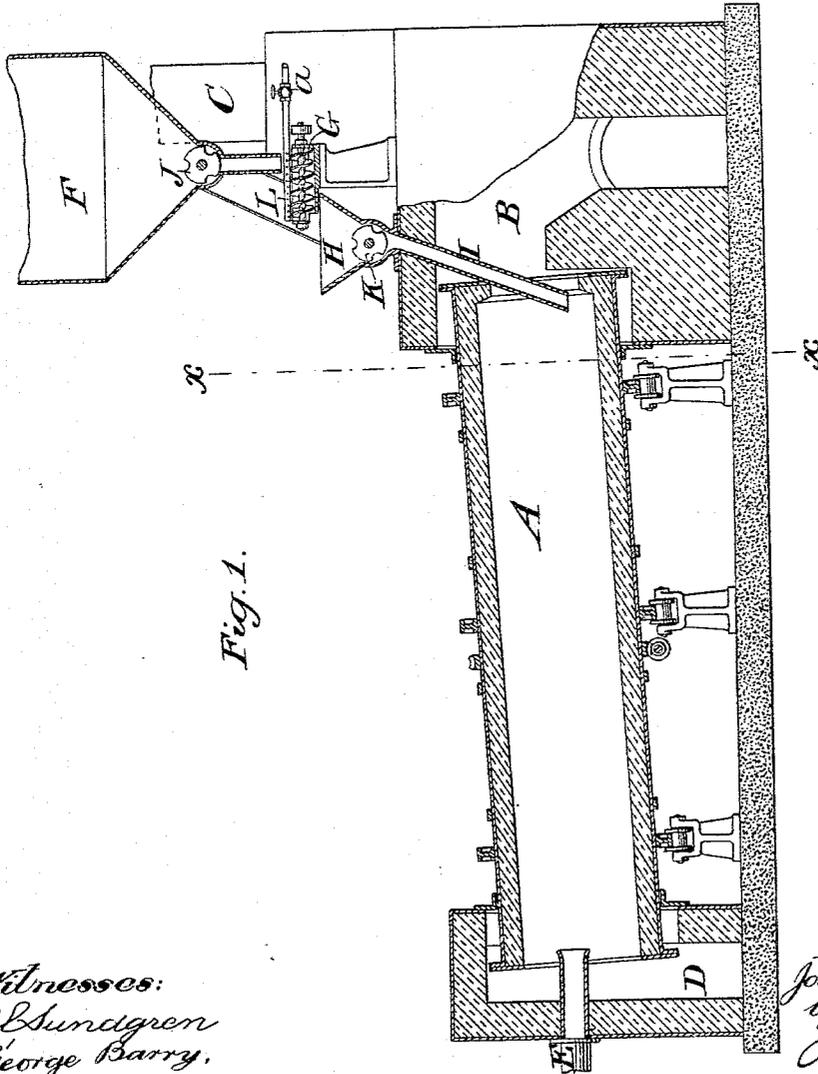


Fig. 1.

Witnesses:
O. Sundgren
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Inventor:
Jose F. de Navarro
by attorneys
Brown & Seward

UNITED STATES PATENT OFFICE.

JOSÉ F. DE NAVARRO, OF NEW YORK, N. Y., ASSIGNOR TO ALFONSO DE NAVARRO, OF SAME PLACE.

APPARATUS FOR CALCINING CEMENT.

SPECIFICATION forming part of Letters Patent No. 531,742, dated January 1, 1895.

Application filed October 19, 1892. Renewed July 21, 1894. Serial No. 518,286. (No model.)

To all whom it may concern:

Be it known that I, JOSÉ F. DE NAVARRO, a resident of the city of New York, in the county and State of New York, have invented a new and useful Improvement in the Apparatus for Calcining Cement, of which the following is a specification, reference being had to the accompanying drawings.

In the manufacture of cement it has been found desirable to reduce the cement material before burning to a condition as nearly as possible to that of fine powder in order that it may be most thoroughly burned, and hence that the cement obtained should be of uniform quality. The finer the degree of pulverization, the better is the quality of the cement produced, but an obstacle to the profitable burning of the finely powdered material has been a great waste which has resulted from so much of the powder being carried off to the chimney by the draft of the furnace. I remedy this difficulty by moistening the powder thoroughly to a just sufficient degree to prevent it from flying with the draft yet not sufficient to destroy its pulverulent condition, leaving all its fine particles sufficiently mobile with respect to each other to enable them to be exposed in an infinitesimally divided condition to the heat of the furnace.

In order to moisten the powder thoroughly and to a proper degree, I apply the moisture to the dry pulverulent material while it is being stirred and while on its way to the furnace, and to this end my invention consists in the combination of devices hereinafter described and claimed.

Figure 1 in the accompanying drawings represents a vertical longitudinal section. Fig. 2 represents a transverse sectional view in the line $x x$ of Fig. 1.

Similar letters of reference designate corresponding parts in both the figures.

A is the main cylinder of the furnace which may be constructed in the manner common to the cylinders of rotary furnaces, of a cylindrical shell of iron with a fire-brick lining, the said cylinder being open at both ends and having a longitudinal inclination. It is represented as supported and rotated upon roll-

ers in the manner common to such furnace cylinders. The upper end of the cylinder communicates with the chamber B from which ascends a chimney C. The lower end of the said cylinder communicates with the chamber D through the outer wall of which is introduced the heat for heating the interior of the cylinder, the heat in the example represented being supplied by the fuel gas introduced through said chamber by a pipe E. In a suitable position near the higher end of the cylinder is an elevated bin F from which the cement material, previously reduced to a powder and finely bolted, is supplied to the upper end of the cylinder by means of a screw conveyor G arranged under the bin F to receive the powdered material therefrom and a conductor H I to receive the powdered material from the conveyor G and conduct it into the cylinder. The conductor H I consists of a hopper H, the spout I of which enters into the outer end of the cylinder. A stirrer J is arranged at the outlet of the bin F and a stirrer K is arranged in the throat of the hopper to keep the material loose that it may be fed freely.

Arranged above the conveyor G is a jet pipe L represented as consisting of a pipe arranged above and lengthwise of the screw-conveyor and finely perforated. This pipe which may receive water or steam from any suitable source is furnished with a regulating valve a by which to regulate the quantity of water or steam delivered through its perforations so that the cement in its passage through the conveyor receiving numerous jets of steam or water from said pipe may be moistened to the required degree. The water or steam being sprinkled or jetted upon the powdered material while it is in motion in the conveyor and stirred by the screw thereof becomes very thoroughly distributed among the powdered material which therefore becomes uniformly moistened. The degree to which this moistening is effected must be very carefully guarded so that it shall not be sufficient to produce such great cohesiveness between the particles of the material as to render them compact but shall leave the material in a loose crumbly or friable condition in which it

passes through the conductor into the upper
end of the cylinder and in which condition it
remains as it passes through the cylinder in
the burning process. This condition, while
5 it is such that it will not be carried back by
the draft of the chimney, is such that all its
fine particles are exposed completely to the
heat and so perfectly burned as to produce
cement of the most perfectly uniform quality.
10 The great advantage of my invention is
that it provides for the thorough and uniform
moistening of all the particles of the finely
powdered cement and for effecting this moist-
ening to any determined degree. This is a
15 result which has been long aimed at in the
manufacture of cement and numerous experi-
ments show that such a thorough and uniform
moistening of the cement when very finely
ground can only be effected at a point near
20 where it enters the furnace and while it is in
constant agitation on its way thereto.

What I claim as my invention, and desire
to secure by Letters Patent, is—

1. The combination with a furnace and a
feeding apparatus for feeding pulverized cem- 25
ent material thereto, of means for moisten-
ing the said material while in said feeding
apparatus on its way to the furnace, substan-
tially as herein set forth.

2. The combination with a furnace, of a 30
screw conveyer for conveying toward said
furnace the material to be burned therein and
stirring the said material during its convey-
ance, and a jet pipe for moistening said ma-
terial in the conveyer while undergoing the 35
stirring operation therein on its way to the
furnace, substantially as herein set forth.

JOSE F. DE NAVARRO.

Witnesses:

FREDK. HAYNES,
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