

March 26, 1929.

R. E. MINOGUE

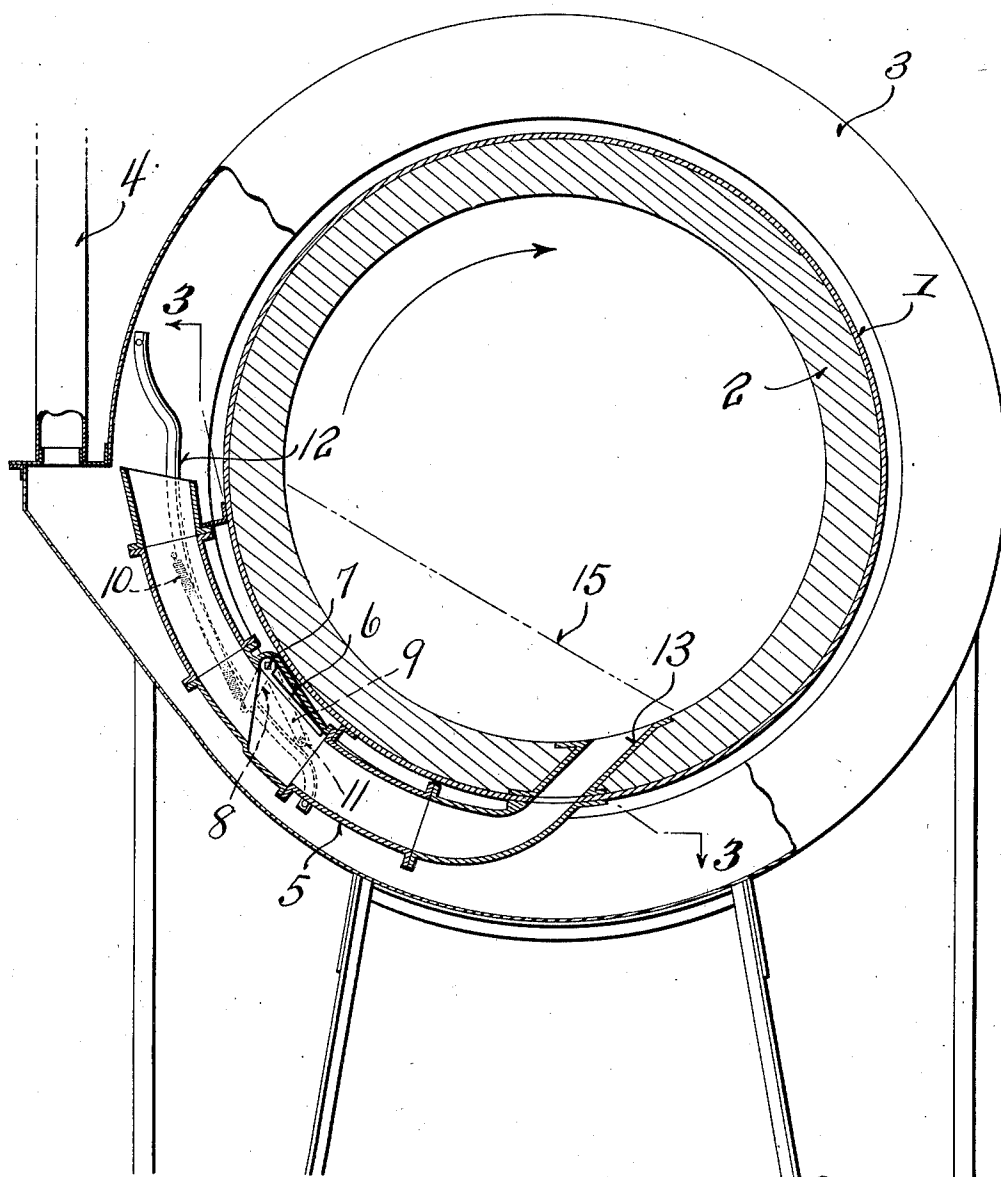
1,707,191

ROTARY KILN FEED

Filed June 18, 1926

2 Sheets-Sheet 1

Fig. 1



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Fig. 2

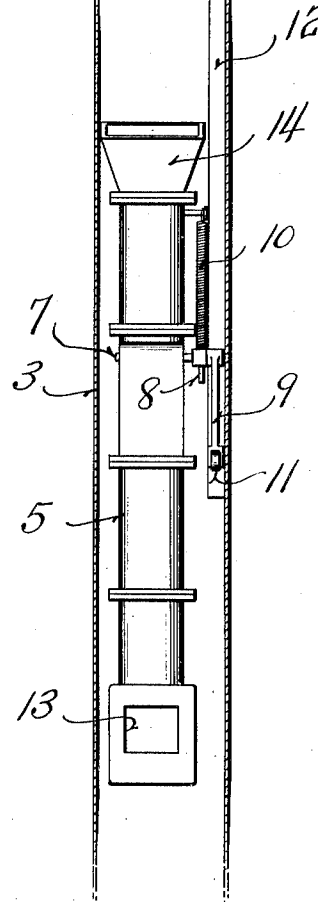
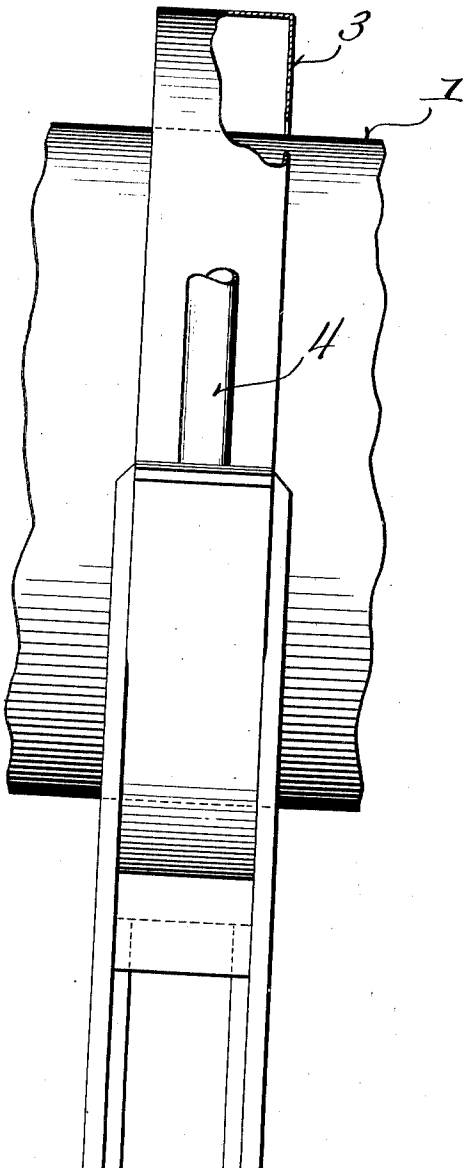


Fig. 3

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UNITED STATES PATENT OFFICE.

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ROTARY-KILN FEED.

Application filed June 18, 1926. Serial No. 116,867.

This invention relates to a device for feeding the flue dust to the kiln of a wet process cement plant.

As heretofore practiced, it is the usual custom to mix the flue dust with the wet slurry. This flue dust has properties that make the slurry practically impossible to handle and, consequently, materially decrease the value of the output from the plant.

This invention is designed to overcome the above noted defects in recovering flue dust and mixing it with the outgoing material under treatment, and has for its primary objects the mixing of the flue dust with the contents of the kiln in its dry form, and the returning of the flue dust to the kiln in the dry zone. In these devices it is highly advantageous to prevent the entrance of cold air into the kiln. This invention also has for its objects the provision of means for feeding the flue dust uniformly into the kiln while it is in operation without allowing the entrance of cold air.

An embodiment of the invention is shown in the accompanying drawings in which:—
Figure 1 is a transverse sectional view through a rotary kiln showing the feeding device in operation.

Figure 2 is a fragmentary side view with parts broken away showing a portion of the structure illustrated in Figure 1.

Figure 3 is a sectional view developed along the line 3—3 of Figure 1.

Referring to the drawing it will be seen that a rotary kiln 1 of the inclined type is provided. This kiln is preferably lined with fire brick or fire clay, as indicated at 2 in Figure 1, in the usual manner. It is surrounded at any suitable point in its length by an annular receiving compartment 3 which receives the flue dust in a continuous stream from any suitable source, such flue dust being fed downwardly through the pipe 4. This flue dust collects in the lower portion of the annular chamber 3 and is picked up and delivered by the mechanism hereinafter described at each revolution of the kiln.

The kiln is provided with a curved pipe 5 which is preferably formed in sections and which is provided with a flap or valve 6 intermediate its length. This valve is rigidly carried by a rocker shaft 7 which projects outwardly beyond the side of the pipe 5 and is provided with a lever 8, and with a rocker arm or lever 9. The lever 8 is attached to

one end of a tension spring 10, the other end of such spring being attached to a portion of the pipe 5, as indicated. The lever 9 is provided with a roller 11 which is adapted to travel upon a stationary cam track 12, such cam track being carried by the stationary annular receiving compartment 3.

The inner end of the pipe 5 leads into the kiln 1, as indicated at 13 in Figure 1, and is adapted to discharge the dust collected thereby, through such portion. The outer end of the pipe 5 is flared to form a funnel-like scoop 14 which digs into the dust in the lower portion of the receptacle 3 and scoops up the dust into the pipe 5.

The operation of the apparatus is as follows:

The kiln is rotated in the direction indicated by the arrow in Figure 1, and the pipe 5 is filled with flue dust while the pipe passes through the lower portion of the compartment 3. However, the pipe 5 is closed throughout the major portion of the rotation of the kiln by means of the valve 6. When, however, the load 15 (see Figure 1) covers the mouth of the pipe 13, the flap or valve 6 opens. This opening is accomplished by the riding of the roller 11 upon the cam track 12, the position of the parts being as indicated in Figure 1. The flue dust is thus discharged by gravity past the valve through the pipe 5 and into the kiln 1. It is to be noted that the valve closes before the pipe passes from beneath the load 15 within the kiln and consequently there is, at all times, a cold air seal as the pipe is either closed by the load within the kiln, or else is closed by the valve. In addition to this the flue dust is evenly distributed and mixed with the load within the kiln by this apparatus, as it is gradually discharged into the kiln by the action of gravity during the rotation of the kiln. In addition to this, each rotation of the kiln discharges a predetermined measured amount of the flue dust into the kiln, and, consequently, insures the uniformity of the mixture.

It will be seen, therefore, that the flue dust is returned to the kiln at the dry zone and in its dried state. Consequently, the output is of a maximum quality, although the flue dust is recovered.

It will be seen further that an extremely simple and practical device has been pro-

vided for accomplishing the above noted functions and it will be seen further, that the device is wholly automatic in its action, and does not require any thought on the part of the operator.

It is a well known fact in the cement industry that the capacity of a wet process kiln is limited by the amount of slurry which can be fed into the open end of the kiln. This is due to the slurry, which contains approximately 33% moisture, spilling back out of the open end of the kiln, and it is also to a certain extent due to the fact that increasing the amount of slurry put into the open end of the kiln, increases the length of what is commonly called the wet zone of the kiln. It being a well known fact that the shorter the wet zone in the kiln the greater its efficiency is.

In the practice of this invention, it is apparent that any desired material may be fed into the kiln by the apparatus described and it is further apparent that the particular point or zone of the kiln may be selected as desired.

For example, it may be found expedient to feed the slurry into the kiln by means of the construction described in detail above and in this case the slurry would be fed into the wet zone of the kiln.

In this way, it is possible to feed any material at any point of the kiln with the utmost facility.

It is, therefore, to be understood that this construction can be used for the introduction of slurry into the kiln as well as for the introduction of flue dust, as previously set forth in detail.

This invention, therefore, provides a novel means of introducing material into a kiln through a hole in the side of the kiln where the feed pipe opens. Obviously, therefore, the efficiency of the kiln and the capacity thereof, can be greatly increased in the practice of this invention.

Although the invention has been described in considerable detail, such description is intended as illustrative rather than limiting as the invention may be variously embodied and as the scope of such invention is to be determined as claimed.

I claim:

1. The combination of a rotary kiln, an annular chamber surrounding said kiln,

means for conducting material into said chamber comprising a material collecting pipe rigidly carried by said kiln and adapted to rotate with said kiln, said pipe having a discharge mouth opening into said kiln, said pipe being located within said annular chamber, a valve located within said pipe, and means for opening said valve only at the time when said discharge mouth is adjacent its lowest position.

2. The combination of a rotary kiln, an annular dust receiving chamber surrounding the kiln, means for conducting dust into said chamber comprising a curved pipe partly encircling said kiln and rigidly carried by said kiln and located within said annular chamber, said pipe having a discharge mouth opening through said kiln at one end and having a scoop-like portion at its other end adapted to scoop up a charge of dust during each revolution of the kiln, said scoop-like portion and said discharge mouth being circumferentially spaced around said kiln with the scoop-like portion leading, a valve located within said pipe, and means for opening said valve when said discharge mouth is adjacent its lowest position and said scoop-like portion is elevated, and means for holding said valve closed when said mouth has passed from a position adjacent its lowest position.

3. The combination of a rotary kiln, an annular dust receiving chamber surrounding the kiln, means for conducting dust into said chamber comprising a curved pipe partly encircling said kiln and rigidly carried by said kiln and located within said annular chamber, said pipe having a discharge mouth opening through said kiln at one end and having a scoop-like portion at its other end adapted to scoop up a charge of dust during each revolution of the kiln, said scoop-like portion and said discharge mouth being circumferentially spaced around said kiln with the scoop-like portion leading, a valve located within said pipe, means tending to hold said valve closed, and cam means for opening said valve when said discharge mouth is adjacent its lowest position.

In testimony that I claim the foregoing I have hereunto set my hand at Manitowoc, in the county of Manitowoc and State of Wisconsin.

ROLAND E. MINOGUE.