

T. M. MORGAN.
CEMENT KILN.
APPLICATION FILED FEB. 1, 1907.

942,509.

Patented Dec. 7, 1909.

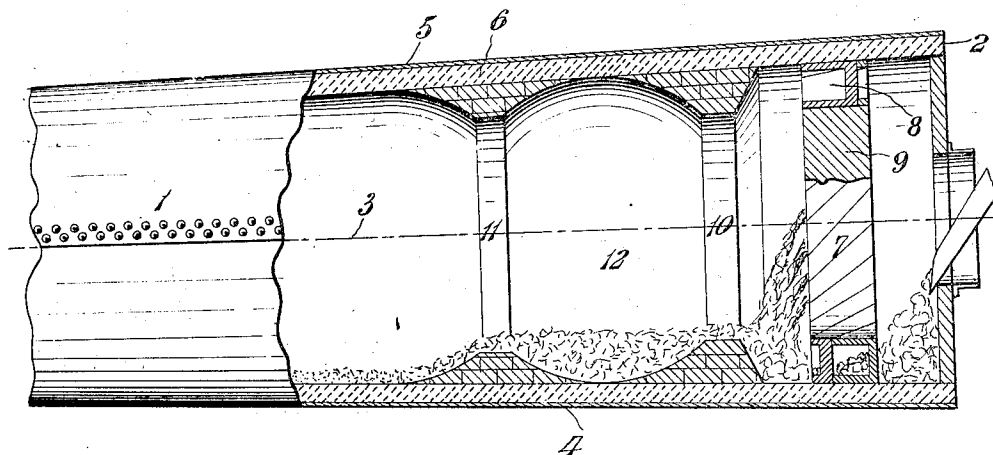
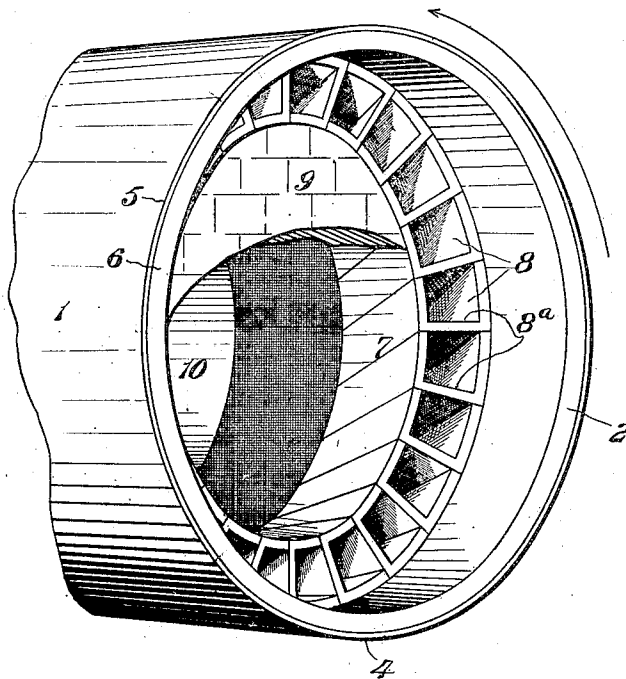


Fig. 1.

Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

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CEMENT-KILN.

942,509.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Application filed February 1, 1907. Serial No. 355,190.

To all whom it may concern:

Be it known that I, THOMAS MATTHEW MORGAN, of the village of Long Point, in the county of Hochelaga, Province of Quebec, and Dominion of Canada, have invented certain new and useful Improvements in Cement-Kilns, of which the following is a full, clear, and exact description.

This invention relates to rotary kilns for burning cement.

The ordinary cement kiln consists of a long cylindrical tube, which is inclined downwardly from its rear to its front end. As the kiln is revolved, the cement is gradually carried forward and is ejected at the mouth. In order to conserve the heat and increase the efficiency, cement kilns have been considerably lengthened during recent years. This has not only added to the original cost of the kiln but has greatly increased the weight and, consequently, the cost of revolving the kiln.

The object of this present invention is to provide a comparatively short kiln which will be less expensive both to construct and to maintain in operation than the longer kilns, and that will, at the same time, so conserve the heat from the fuel that the efficiency will be greatly increased. To accomplish this object, I provide a kiln of frusto-conical form considerably larger at the rear end than at the mouth. The longitudinal axis of the kiln is inclined in the usual manner, approximately three quarters of an inch to the foot, while the bottom of the kiln remains in a horizontal plane. Near the rear end of the kiln, I provide a wall having a series of circumferential apertures which are obliquely disposed with reference to the axis of the kiln and which allow the cement, fed in at the rear end of the kiln, to flow through by gravity toward the front, and, at the same time, allow the burned gases to escape into the stack. The central part of the wall is built up of any suitable material.

In order to prevent the cement at the rear end of the kiln from being fed forward too rapidly, owing to the increased circumferential velocity at the enlarged end of the kiln, I provide one or more retarding rings which regulate the feed of the cement through the kiln. Owing to the increased diameter, the velocity of the burning gases is retarded at the enlarged end of the kiln, and a large amount of heat, ordinarily given

up in stack losses, is deflected back toward the mouth of the kiln by the retarding rings and rear wall, and is absorbed by the cement.

In the drawings which illustrate my invention:—Figure 1 is a side elevation, partly in section, of the rear end of the kiln fitted with my device. Fig. 2 is a perspective view of the rear end of the kiln showing the circumferentially apertured wall.

Referring to the parts, 1 designates a kiln of frusto-conical form which is gradually enlarged toward its rear end 2. The longitudinal axis 3 is given the usual downward inclination, while the bottom line 4 lies in a horizontal plane in order that the kiln may rest upon supports that lie in the same horizontal plane.

5 designates the shell of the kiln, and 6 75 the fire brick lining.

Near the rear end of the kiln, I provide a circular wall 7 having a series of circumferential apertures or channels 8, which are inclined obliquely with reference to the longitudinal axis of the kiln. These channels are preferably rectangular in cross section and are formed of metal or other suitable material, and are so positioned that, when the kiln rotates in the direction indicated by the arrow, the cement, which is fed in at the rear end, will be scooped up at the mouth of the aperture by the advancing edges 8^a of the channels and, on being carried around the circumference of the kiln, will fall by gravity through the inclined channels toward the front of the kiln. The central part of the wall 9 is closed in with fire brick. At a suitable distance in front of the wall 7, I provide a retarding ring 10, which is formed by increasing the thickness of the lining 6. A second retarding ring 11, formed in the same manner, is separated from the first ring by a chamber 12, as shown in Fig. 1. By this means the diameter of the enlarged end of the kiln is reduced at certain points so that the forward feed of the cement may be regulated to suit the requirements at the mouth of the kiln.

In the operation of the device, the cement material is fed into the rear end 2 and piles up at the bottom of the kiln. On rotating the kiln in the direction of the arrow, the cement falls into and is scooped up by the channels 8 and, on being carried around the circumference, falls, by gravity, through the downwardly inclined channels to the front

of the wall. Owing to the increased circumferential velocity of the kiln at its enlarged end, the forward feed would be faster at the rear end than at the front end. By means of the retarding rings, however, which decrease the diameter of the kiln at certain intervals, the forward feed is regulated so that the material will not tend to pile up at the mouth of the kiln. The velocity of the heated gases traveling from the front to the rear, will be greatly retarded owing to the increasing sectional area toward the rear of the kiln, and will further be deflected by the retarding rings and the rear wall 7 so that a great percentage of the heat will be retained within the kiln and absorbed by the cement. The hot gases which escape through the apertures 8, will heat the walls of said apertures to high degree of intensity. These apertured channels, having a large heating surface and being submerged at each revolution in the cement, will impart their heat to the cement and be cooled thereby. In this manner a great percentage of the heat ordinarily lost in the stack will be absorbed by the cement and the efficiency of the kiln will be increased thereby.

Further advantages will be apparent in a comparatively short kiln of this type. The kiln will be stronger, more durable, and less expensive both to construct and to operate than the longer types of kilns. The revolving gear used to operate the kiln of frusto conical form, may be placed at the extreme rear end without danger of undue strain. Furthermore, the supports lying in the same horizontal plane, will not be so liable to damage from expansion and con-

traction of the kiln, as those which operate under an inclined kiln.

While I have shown the device as applied to a kiln which is frusto-conical in form, it will be obvious that the rear wall 7 may be built into any cylindrical kiln in the same manner and for the same purpose. It will also be obvious that the construction shown herein may be modified without departing from the spirit of my invention.

Having thus described my invention, what I claim is:—

1. A cement kiln of gradually increasing diameter, toward its rear end, a wall having a series of inclined channels within said kiln, and means for retarding the flow of cement in its passage through the enlarged portion of the kiln,

2. A cement kiln of frusto-conical form having its longitudinal axis inclined and its lower face lying in a horizontal plane, a wall near the rear end of said kiln, means for allowing the cement to flow through said wall, and means for retarding the passage of the cement within the enlarged portion of the kiln.

3. A cement kiln of frusto-conical form having a wall located near its rear end, a plurality of inclined channels passing through said wall, and one or more retarding rings located between said wall and the mouth of the kiln.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

THOMAS MATTHEW MORGAN.

Witnesses:

C. W. TAYLOR,

E. B. MCKENZIE.