Nov. 10, 1931. L. S. PETERSEN 1,830,959

ROTARY KILN AND COOLER

Filed Feb. 7, 1928

Fig. 1.

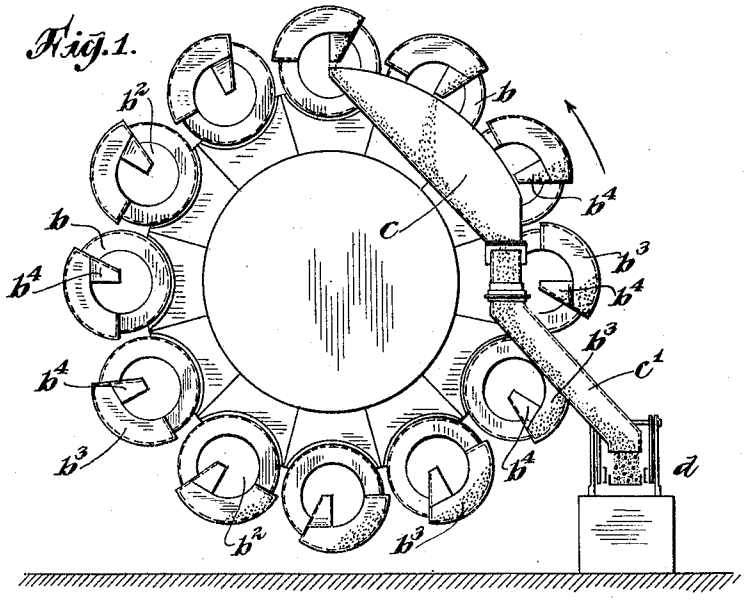
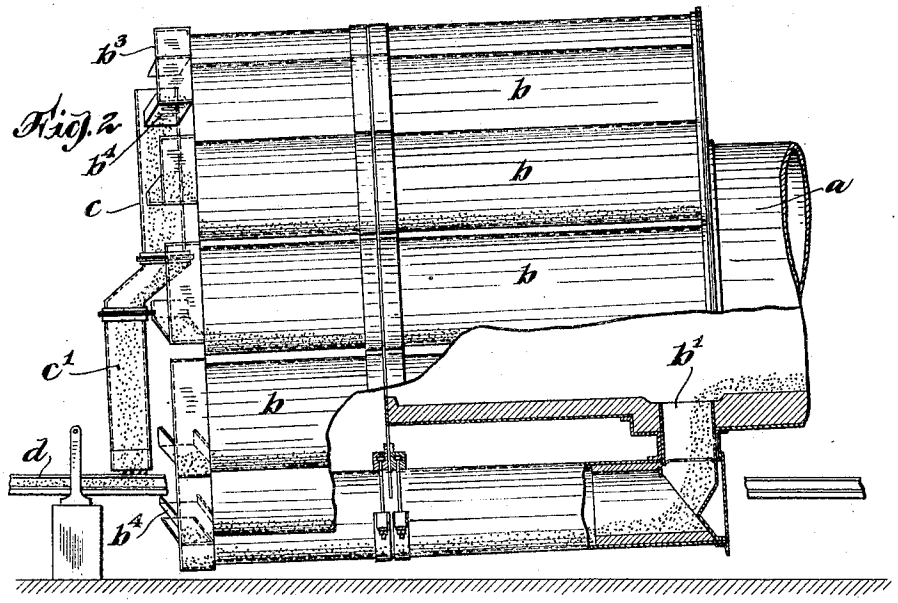


Fig. 2.



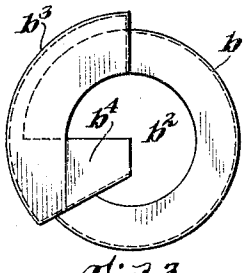


Fig. 3.

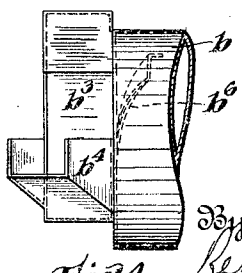


Fig. 4.

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Patented Nov. 10, 1931 1,830,959

UNITED STATES PATENT OFFICE

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ROTARY KILN AND COOLER

Application filed February 7, 1928. Serial No. 252,634.

This invention relates to rotary kilns and coolers employed in the production of cement clinker and in which the clinker formed in the kiln is discharged from the clinkering zone of the kiln into the several drums of a circumferential series of cooling drums which are supported about the periphery of the kiln and revolve with the kiln. The clinker is partially cooled in its passage through these cooling drums and is discharged therefrom into a conveyor by which it is delivered to the grinding mills or elsewhere. Heretofore the clinker has been discharged from each drum at or near the lowest point in its revolution into a hopper below such lowest point, from which it moves by gravity through a chute to the conveyor. This old arrangement has necessitated the provision of a pit, upwards of twenty feet in depth, under the discharge end of the kiln, involving expense in its construction and incidentally, since the conveyor is at the bottom of the pit, considerable additional expense in the provision of means for the handling of the clinker and in the operation of such means. The present invention has for its object to make unnecessary the provision of such a pit as that referred to and to enable the conveyor to be placed at a much higher elevation in relation to the kiln and the cooling drums, thereby avoiding the considerable expense incident to the location of the conveyor at the bottom of a deep pit. In accordance with the invention each cooling drum is provided with a discharge spout of such character as described hereinafter, that the clinker will be discharged from each cooling drum at or near the highest point in its revolution about the axis of the kiln into a chute by which it is conducted to the conveyor which can be placed at a level materially higher in relation to the kiln than heretofore and arranged to move in a direction either parallel with the axis of the kiln or transverse thereto. The invention will be more fully explained hereinafter with reference to the accompanying drawings in which several embodiments of the invention are illustrated and in which:

Figure 1 is a view in end elevation, mainly in outline, of a kiln, its cooling drums and associated devices constructed and arranged in accordance with the invention.

Figure 2 is a view of the same in side elevation and partly in section.

Figures 3 and 4 are detail views on a larger scale in side elevation and end elevation, respectively, of the end portion of one of the cooling drums shown in Figures 1 and 2 with its discharge spout.

In the embodiments of the invention illustrated in the drawings the kiln a, which may be of usual construction and supported in the usual manner for rotation about its longitudinal axis, has secured thereto a circumferential series of cooling drums b which revolve about the axis of the kiln in the rotation thereof. These cooling drums are supported and operated in the usual manner, not necessary to be described herein, communicating at one end with the interior of the kiln, as indicated at b^1, to receive from the kiln in its rotation the hot clinker which is to be cooled through contact with the cool air which enters the drums. By reason of the inclination of the axis of the kiln, with which the drums are parallel, the clinker which is received from the kiln by each drum when the drum is near the lowest point of its movement, moves longitudinally in each drum toward the other end of the drum. In the operation of rotary kilns and coolers of the type indicated, the cooled clinker passed from the open discharge end of the drum, when the drum was at the lowest point of its revolution, falling through a chute by which it was conducted to a conveyor or elsewhere. This arrangement, as hereinbefore pointed out, requires the provision of a pit below the cooling drums. To obviate the necessity of providing such a pit each cooling drum b, in accordance with the present invention, is provided with a delivery spout which is so constructed and arranged as to discharge the clinker at a point approximately at or above the level of the kiln axis, into a chute which conducts it to a conveyor or elsewhere as may be desired.

In the construction shown in Figures 1 to 4, each drum b has at its discharge end an opening b^2 through which the clinker is de-

livered into a receptacle b^3 which forms a part of a delivery spout b^4. The receptacle b^3 conforms generally to the curvature of the drum and each drum is so placed that the clinker passes into the receptacle when the drum is at or near the lowest point in its movement.

The spout b^4 is laterally directed, being in this instance directed toward the axis of the cooling drum and discharging the clinker laterally toward or across the axis of the drum. Within the drum may be placed a flight or guide plate b^6, obliquely disposed, which serves to feed the clinker forward in the drum, into the receptacle b^3 and into the spout b^4 as the position of the drum and the flight changes in the revolution of the drum about the axis of the kiln. Adjacent to the end of the kiln a and the ends of the cooling drums as they revolve with the drum is placed a chute c in such position that it will receive the clinker from the delivery spouts of the drums as the drums pass above the level of the axis of the kiln and the delivery spouts assume an inclination from the horizontal, as shown in the upper right-hand portion of Figure 1, so that the clinker, which, in the revolution of each drum beyond its high point, has reached the receptacle and the spout, will be discharged into the transverse chute c from which it may be conducted through a chute c^1 to a conveyor d. It will be seen that by this construction and arrangement the conveyor may be placed substantially at the level of the furnace floor instead of having to be placed, as heretofore, in a pit formed below the kiln and the cooling drums.

It will be observed that in the construction shown in the Figures 1 to 4 the direction of rotation of the kiln is indicated as counter-clockwise, the spout of each cooling drum discharging into the chute c as the drum passes above the level of the kiln axis and the spout assumes an inclination toward the chute.

It will be understood that various changes in detail of construction and arrangement may be made to suit different conditions of use and except as pointed out in the accompanying claim the invention is not restricted to the particular construction and arrangement shown and described herein.

I claim as my invention:

The combination of a rotary kiln for the manufacture of cement and the like, a circumferential series of drums mounted to rotate with the kiln, each of said drums communicating at one end with the interior of the kiln to receive the clinker therefrom and being adapted to discharge the cooled clinker at the other end, a spout carried by each drum at its discharge end and external thereto to receive the clinker from the drum, said spout being directed toward the axis of the kiln to discharge the clinker toward the axis of the kiln, and a chute disposed within the circle of the spouts to receive the clinker from the spouts in succession as each spout reaches its highest point, the chute being directed downwardly and outwardly.

This specification signed this 6th day of February, A. D. 1928.

LOUIS STEFFEN PETERSEN.