Oct. 7, 1941. C. J. SCOVRON 2,258,518

ROTARY KILN LINING

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FIG. 1.

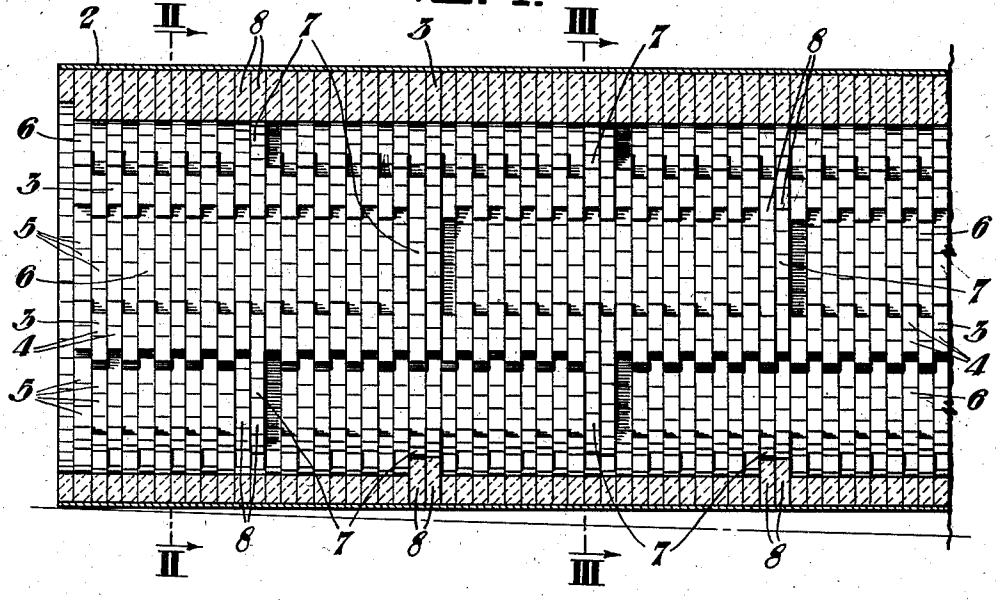


FIG. 2.

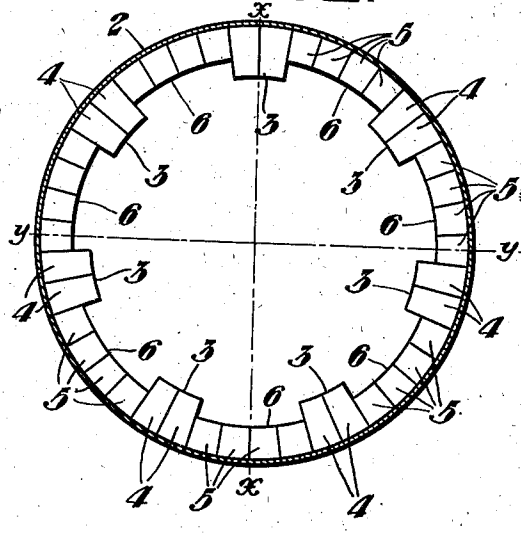
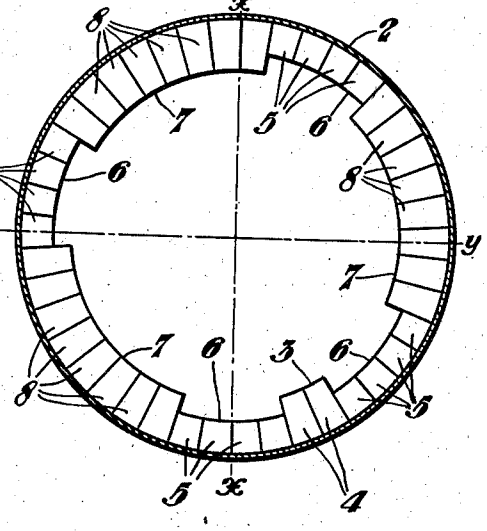


FIG. 3.



Inventor:
CHARLES J. SCOVRON,
by: John E. Jackson
his Attorney.

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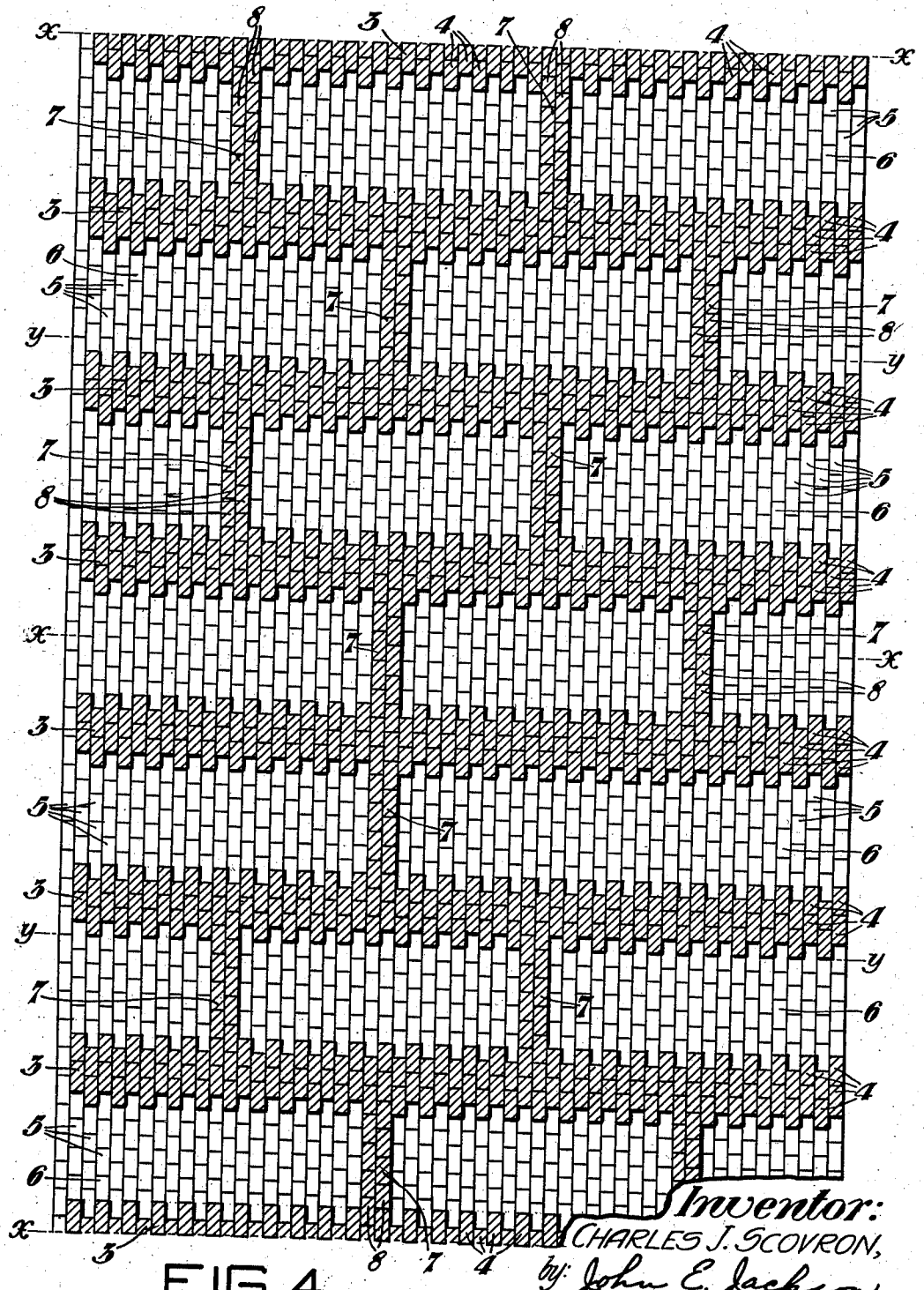


FIG. 4.

Inventor:
CHARLES J. SCOVRON,
by: John E. Jackson
his Attorney.

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UNITED STATES PATENT OFFICE

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ROTARY KILN LINING

Charles J. Scovron, Donora, Pa., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey

Application January 11, 1940, Serial No. 313,449

1 Claim. (Cl. 263—32)

This invention relates to improvements in linings for rotary kilns and the like.

In the processing of certain materials, such as low grade ores, residues, etc., they are sometimes heated and rotated in kilns for driving off and collecting the contained volatile substances by what is known as the Waelz process.

Certain residues treated in the Waelz kiln are highly viscous in character and tend to follow the rotary travel of the kiln in a mass without completely releasing the contained volatiles.

It is an object of the present invention to provide a lining for such a kiln which will impart increased agitation to the residue or material for completely releasing the volatile substances contained therein.

Another object is to provide a lining which will break up the mass of the material to prevent molding thereof throughout the kiln, and to effect a positive advance or feed of the material through the kiln.

A further object is to provide a lining of the character stated formed of standard brick incorporating the aforementioned features therein in a simple and economical construction which may be readily applied to a kiln.

Additional objects and advantages will become apparent from the following description taken in connection with the accompanying drawings wherein:

Figure 1 is a longitudinal sectional view of a portion of a rotary kiln showing the lining of my invention;

Figures 2 and 3 are cross-sections taken on the lines II—II and III—III of Figure 1, respectively; and

Figure 4 is a schematic developed view of the brick layout of the lining.

Referring to the drawings, 2 designates the outer cylindrical shell or body of a rotary kiln, as for example, a Waelz kiln for the recovery of zinc, cadmium, lead, etc. from retort or furnace residues. Said kiln is designed to rotate about its longitudinal axis in a slightly inclined position, whereby the contents may travel throughout the kiln during its operation.

As stated, certain residues, such as those from zinc furnaces, are highly viscous, and in order to properly treat the same in the kiln, it is necessary to prevent sliding thereof along the kiln lining, and to prevent mass formation of the residue.

I have found that the best results may be obtained by agitating the residue, breaking it up to prevent mass formation thereof into a "sausage" or roll extending through the kiln, and to positively feed or advance the broken material through the kiln.

For these purposes, the generally cylindrical refractory brick lining of the kiln is provided with a plurality of spaced longitudinal inwardly extending projections or ribs 3, preferably formed by double rows of bricks 4 of greater depth than the bricks 5 comprising the major portion of the lining.

The ribs or projections 3 are spaced circumferentially of the kiln, providing smooth lining portions 6 therebetween, which portions have proper extent between the ribs 3 to produce the desired action of the material as hereinafter described.

Connecting and extending between the projections or ribs 3, I provide a series of transverse feed ribs or projections 7, preferably composed of double rows of bricks 8 of greater depth than the bricks 5, said feed ribs extending inwardly from the smooth brick portions 6. Ribs 7 are arranged in staggered relation longitudinally of the kiln, whereby the said ribs 7 of a portion 6 are staggered with respect to those of the next adjacent portions 6.

In operation, the longitudinal ribs 3 impart a tumbling movement to the material in the rotating kiln, the circumferential width of the smooth lining portions 6 between ribs 3 preferably exceeding the corresponding dimension of the said ribs, and being of sufficient width to permit travel of the residue longitudinally of the kiln without clogging or packing between ribs.

The tumbling mass of material is engaged at intervals by the feed ribs 7, whereby the same is severed into sections or portions. The ribs 7 of each lining portion 6 will serve the mass of the material on said portion, and the severed material will again be severed by the ribs 7 of the next portion 6 which the mass engages, and so on, to continually maintain the material in broken condition.

Also, the series of staggered feed ribs 7 functions as a multiple screw to feed the material being treated longitudinally of the kiln, which action together with the inclination of the kiln, provides a positive travel or feed of the material through the kiln.

As clearly shown in the drawings, the several bricks 4, 5 and 8 are all of the standard form employed in the construction of cylindrical linings, no special shape or configuration of bricks being necessary for forming the projecting ribs 3 and 7. The bricks 4, 5 and 8 comprise equal

segments of the lining whereby they are readily laid in the broken joint pattern generally employed in brick work. The developed layout of the present invention in Figure 4 clearly shows the ribs or projections 3 and 7, the same being emphasized by the shading.

A rotary kiln employing a lining of the character stated will provide for complete and efficient agitation and breaking-up of the material being treated, thereby continually exposing new surfaces or portions of the material for release of the contained volatile substances.

Various changes and modifications are contemplated within the scope of the following claim.

I claim:

A cylindrical refractory lining for inclined rotary kilns of the Waelz type including a plurality of ribs extending longitudinally throughout the kiln, said ribs extending inward beyond the lining proper and having projecting radial faces, said ribs being spaced circumferentially of the lining to permit tumbling agitation of a mass of material in the kiln by the lining portions between said ribs, and a plurality of circumferentially disposed ribs extending radially inward beyond the lining proper and transversely of the lining portions between and at right angles to the longitudinal ribs, the transverse ribs being longitudinally staggered between adjacent longitudinal ribs for severing and advancing the mass in the kiln, said lining and ribs being composed of refractory brick, the brick of the ribs having a greater radial dimension than the bricks of the lining proper, and the rib and lining bricks being laid in regular broken joint pattern throughout the entire lining.

CHARLES J. SCOVRON.