

Jan. 26, 1932.

L. L. LADD

1,842,411

MONORAIL CONVEYER FOR ANNULAR KILNS

Filed May 29, 1929

3 Sheets-Sheet 1

Fig. 1.

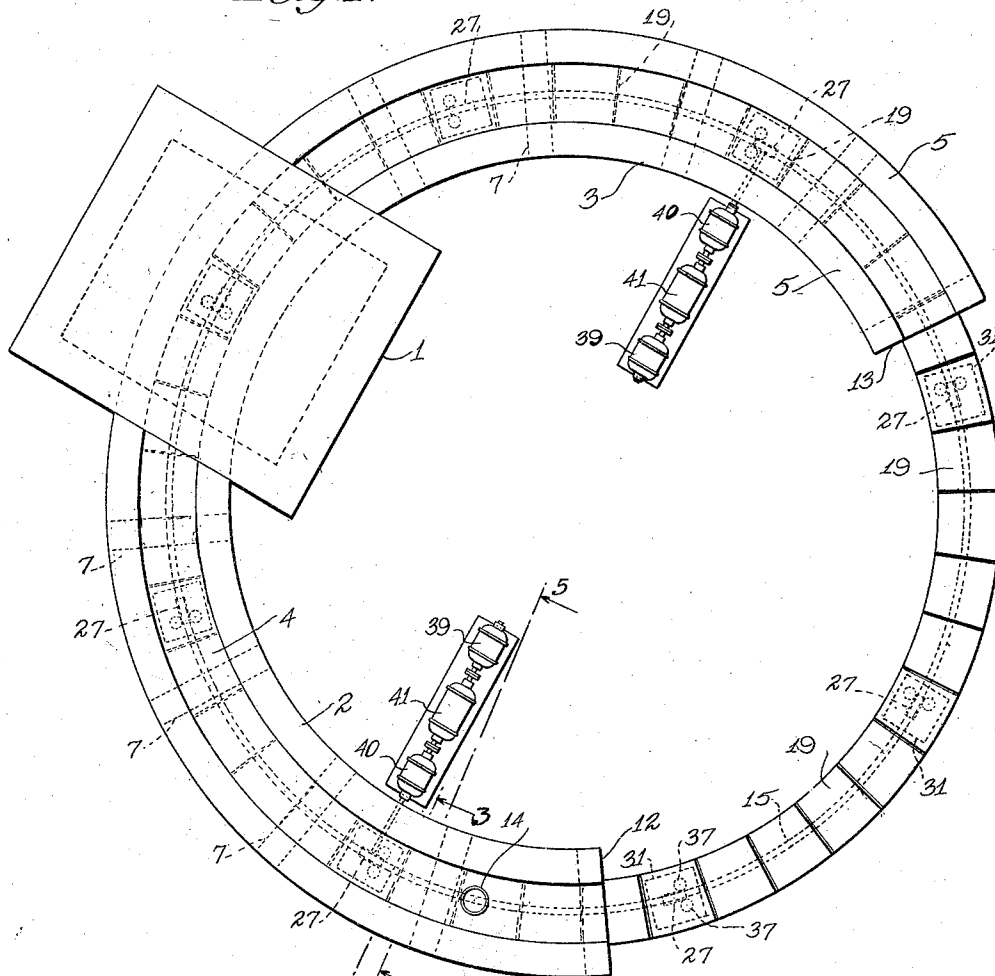
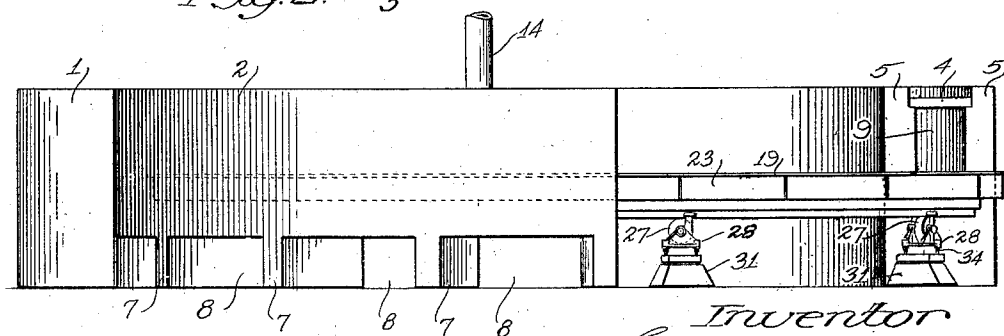


Fig. 2.



Witness
K. B. Anderson,

Inventor
Lester L. Ladd,
By Hummel & Hummel,
Attys

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L. L. LADD

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Fig. 3.

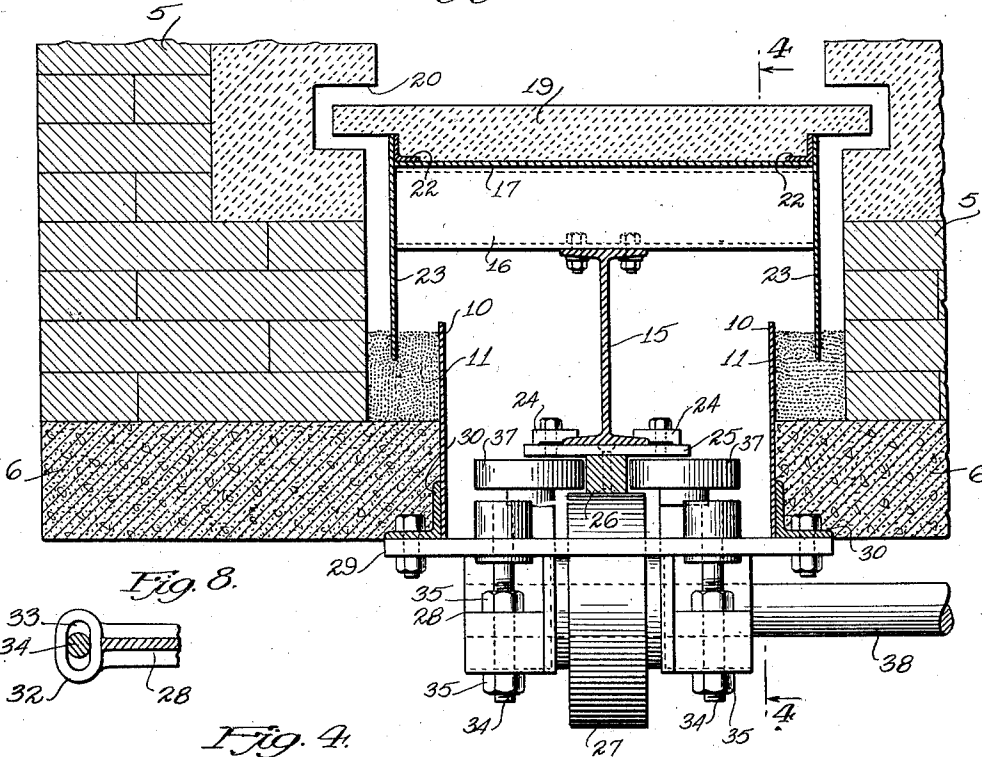


Fig. 8.

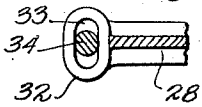
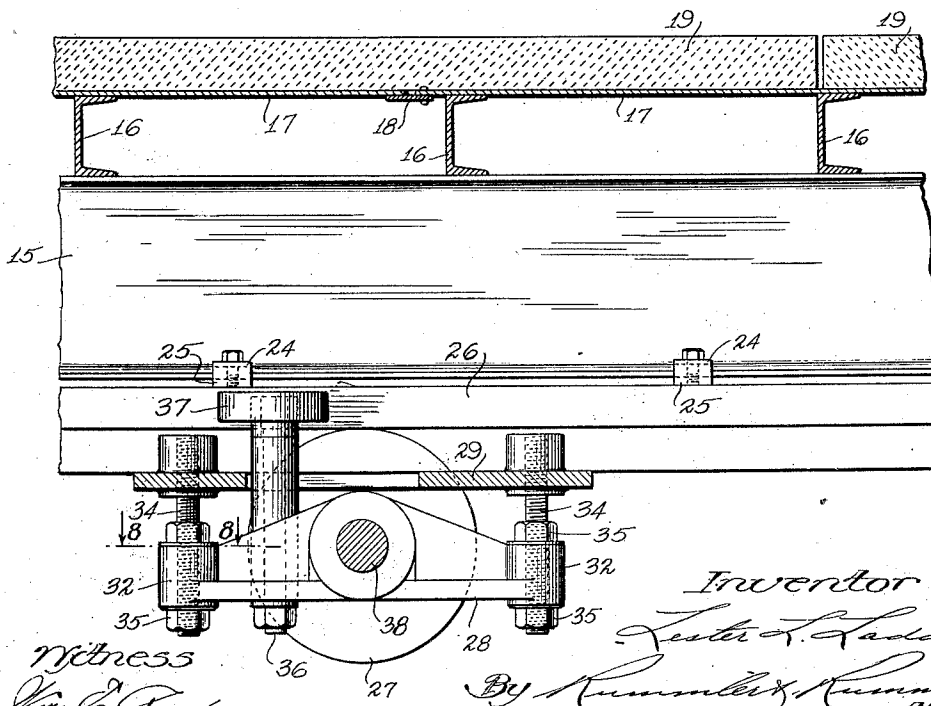


Fig. 4.



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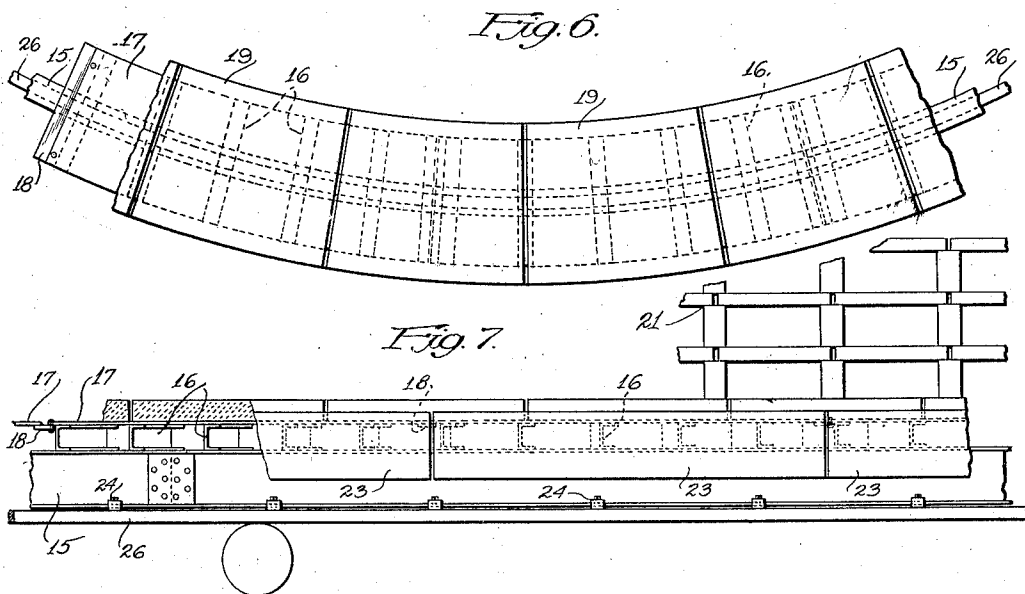
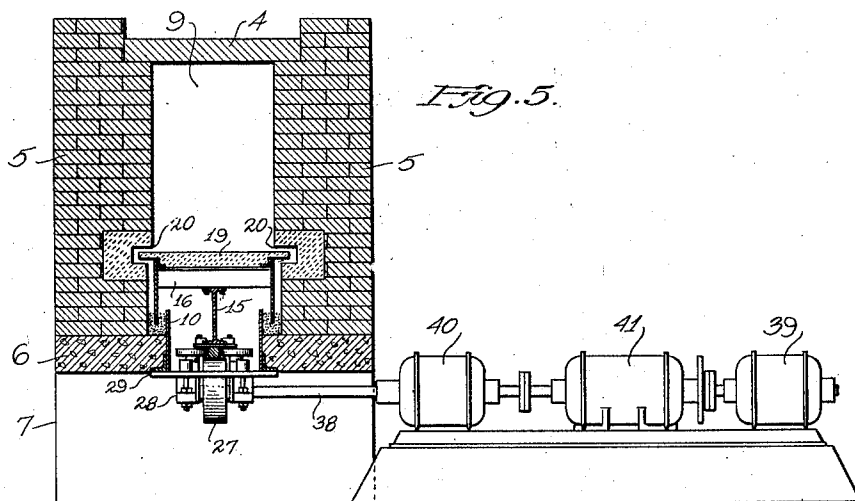
L. L. LADD

1,842,411

MONORAIL CONVEYER FOR ANNULAR KILNS

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3 Sheets-Sheet 3



Witness
Wm. E. Anderson,

Inventor
Lester L. Ladd,
By *Rummler & Rummler,*
Attys.

UNITED STATES PATENT OFFICE

LESTER L. LADD, OF LOCKPORT, ILLINOIS

MONORAIL CONVEYER FOR ANNULAR KILNS

Application filed May 29, 1929. Serial No. 366,959.

The main objects of this invention are to provide an improved form of conveyer for an annular kiln; to provide a conveyer of this kind having an improved expansible and contractable table for supporting the wares; to provide improved mechanism for supporting and driving said conveyer; and to provide improved means for guiding said conveyer in a circular path.

10 An illustrative embodiment of this invention is shown in the accompanying drawings, wherein:—

Figure 1 is a top plan of an improved mono-rail conveyer in an annular kiln, showing certain portions in dotted outline.

15 Fig. 2 is a side elevation thereof.

Fig. 3 is an enlarged fragmentary transverse section taken on the line 3—3 of Fig. 1.

20 Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3.

Fig. 5 is a transverse vertical section taken on the line 5—5 of Fig. 1.

Fig. 6 is a fragmentary top plan of the conveyer.

25 Fig. 7 is a fragmentary side elevation of the conveyer, showing part of the superstructure which supports the wares.

Fig. 8 is a detail in section, taken on the line 8—8 of Fig. 4.

30 In the construction herein shown, the kiln comprises an arcuate furnace through which the wares are conveyed slowly by an improved annular conveyer having a mono-rail supported on a plurality of wheels, certain of which are power driven for frictionally driving the conveyer along a fixed circular path. Improved sand seals are located on respectively opposite sides of the conveyer so as to permit normal atmospheric conditions to prevail below the conveyer where the metal supporting wheels and bearings are located. The supporting wheels and bearings of this improved kiln are all located in pits where they are readily accessible for repair or replacement.

45 In the construction shown, the furnace includes a firing chamber 1 communicating with a pair of arcuate tunnel wings 2 and 3. Heat may be applied to the furnace by gas

burners or any other suitable means located within the firing chamber 1.

The furnace comprises a refractory roof 4 supported on brick walls 5, which are built on a concrete base formed of floor slabs 6 supported on spaced piers 7. In constructing the kiln, the floor slabs 6 are preferably placed at ground level and the ground is excavated within and below the kiln to permit access to pits 8 located between the piers 7. The walls of the furnace define a trough 9, through which the improved conveyer travels.

The inner edges of the floor slabs 6 extend inwardly beyond the walls 5 and support shields 10, which project upwardly to form the inner walls of channels 11, which are filled with sand or other suitable sealing material to prevent the heat in the upper part of the trough 9 from reaching the pits 8, in which the bearings and driving mechanism are located.

The extremities of the tunnel wings 2 and 3 are open so as to provide an inlet 12 and an outlet 13 respectively for the conveyer. The wing 2 has a chimney 14 adjacent the inlet 12, through which part of the moisture laden air may be exhausted from the furnace.

In the construction illustrated, the improved conveyer comprises an annular beam 15, on which is rigidly mounted a plurality of radially disposed channel bars 16, which support a table formed of separate segments 17. One edge of each of the table segments 17 is loosely supported on a lap plate 18 rigidly secured to the adjacent segment, as clearly shown in Fig. 4. With this improved construction, the table is permitted to expand and contract under the variations in temperature to which the conveyer is subjected.

Loosely supported on the table segments 17, is a plurality of refractory slabs 19, which project laterally into recesses 20 formed in the furnace walls 5. A temporary superstructure 21 of suitable refractory material may be built on the slabs 19 for supporting the ceramic wares.

Secured to the side edges of the table segments 17, are angle bars 22, which support

depending aprons 23 extending downwardly into the sand seals. The aprons 23 of each table segment 17 are independent of those of other segments so as not to interfere with the expansion and contraction of the table.

Mounted on the lower flange of the beam 15, are clips 24 which support a plurality of cleats 25, to which is rigidly secured an annular mono-rail 26.

In the form shown, the improved mechanism for supporting and driving the conveyer includes a plurality of rollers 27 journaled on horizontal axes directly below the mono-rail 26.

The rollers 27 are supported on bearings 28, which are adjustable vertically and laterally so as to permit each roller to be independently adjusted relative to the conveyer. The bearings 28 for the rollers which are located below the furnace are mounted on supports 29 secured to angle bars 30, which are embedded in the floor slabs 6. The bearings for the rollers which are located outside of the furnace are mounted on suitable foundations 31.

In the construction shown, the bearings 28 comprise castings having bosses 32 provided with openings 33 for receiving bolts 34, which are secured to the supports 29 and foundations 31. Threaded on the bolts 34, are nuts 35, which engage the upper and lower edges of the bosses 32 and which permit the desired vertical adjustment of the bearings. The openings 33 are elongated, as shown in Fig. 8, so as to permit the desired lateral adjustment of the bearings.

Supported on each of the bearings 28, is a pair of bolts 36, on which are journaled idlers 37 which engage respectively opposite sides of the mono-rail 26 for guiding the conveyer.

In the form shown, two diametrically opposed rollers are fixed on drive shafts 38, which are driven by suitable driving units. Each of the driving units preferably comprises a motor 39, reducer 40 and variable reducer 41. The two driving units are independent of each other and each one is capable of driving the conveyer without the assistance of the other unit.

In operation, the conveyer is rotated very slowly. The ceramic wares are loaded onto and removed from the conveyer at points outside of the furnace and, due to the annular form of the kiln, the operation may be continuous.

Inasmuch as there is no positive connection between the conveyer and the driving mechanism, no injury will result to the kiln in the event that the conveyer is suddenly stopped by a jam of the wares. In such event, the wheels 27 will merely slip on the mono-rail 26. In the event of a jam within the furnace, the conveyer may be quickly

rotated in a reverse direction by reversing the driving mechanism.

In this improved construction, there is no appreciable vibration, because the conveyer travels continuously. In kilns, such as the straight tunnel type, where the conveyers are repeatedly started and stopped, the vibration damages the ceramic wares to a considerable extent. With applicant's improved kiln there is also considerable saving in the cost of maintenance, because the burners are operated continuously and there is no necessity for the objectionable cooling and reheating of the furnace.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims:

I claim:

1. A conveyer for annular kilns comprising an annular table movable along a circular horizontal path, an annular mono-rail on the lower side of said table, a plurality of rollers journaled below said conveyer in position to support said mono-rail, a plurality of idlers engaging one side of said mono-rail for guiding said conveyer, and mechanism for driving one of said rollers to provide a friction drive for said conveyer.

2. A conveyer for annular kilns comprising an annular table movable along a circular horizontal path, an annular mono-rail on the lower side of said table, a plurality of rollers journaled below said conveyer on horizontal axes and supporting said mono-rail, a plurality of idlers journaled on vertical axes and engaging respectively opposite sides of said mono-rail for guiding said conveyer, and mechanism for driving one of said rollers for frictionally actuating said conveyer.

3. A conveyer for annular kilns comprising an annular table movable along a circular horizontal path, an annular mono-rail on the lower side of said table, a support located below said conveyer, a plurality of bearings mounted on said support, rollers journaled on said bearings on horizontal axes for supporting said mono-rail, and a plurality of idlers journaled on said bearings on vertical axes for engaging respectively opposite sides of said mono-rail to guide said conveyer.

4. A conveyer for annular kilns comprising an annular rail, a plurality of arcuate plates supported on said rail independently of one another to form an annular table, means on one end of each of said plates adapted to slidably support an opposed end of an adjacent plate whereby said table is adapted to expand and contract under temperature variations, and a plurality of refractory slabs supported on said table.

5. A conveyer comprising an annular

mono-rail movable along a horizontal annular path, an annular table supported on said mono-rail, a plurality of vertical posts located below said mono-rail, a plurality of bearings mounted on said posts and adjustable vertically independently of one another, rollers journaled on said bearings and supporting said mono-rail, idlers journaled on said bearings on vertical axes in position to engage said mono-rail for guiding its movement, and means for vertically shifting said bearings to adjust the height of said rollers and idlers.

6. A conveyer for annular kilns comprising an annular table movable along a circular horizontal path, an annular structural steel shape secured to the lower side of said table, an annular mono-rail secured to the lower face of said structural steel shape, a support located below said conveyer, bearings on said support, guide rollers mounted on said bearings for engaging the sides of said mono-rail, rollers on said bearings for supporting said mono-rail, and means for driving certain of said last-mentioned rollers to frictionally actuate said conveyer.

Signed at Lockport this 24th day of May 1929.

LESTER L. LADD.