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AUTOMATIC SUPPORT FOR ROTARY KILNS.

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1,146,590.

Patented July 13, 1915.

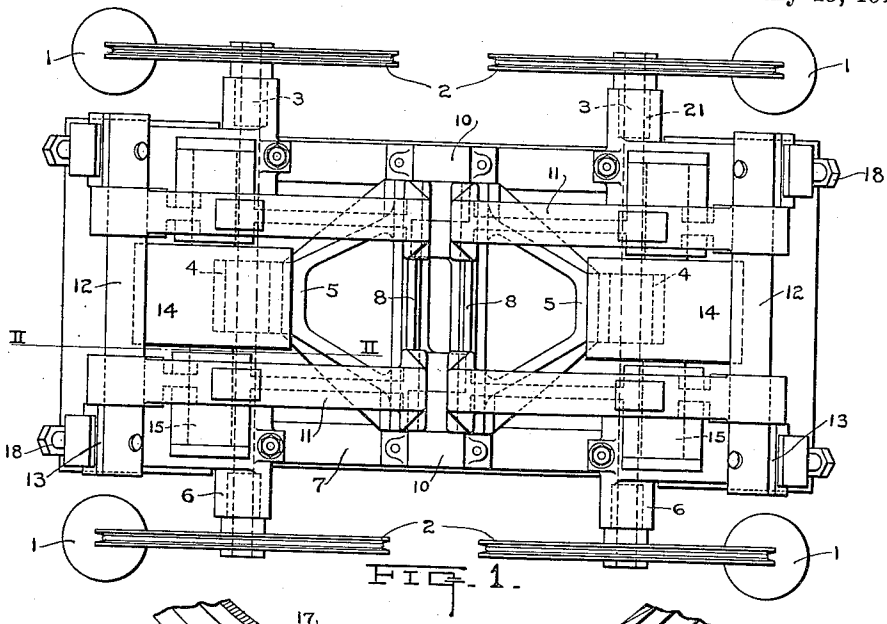


FIG. 1.

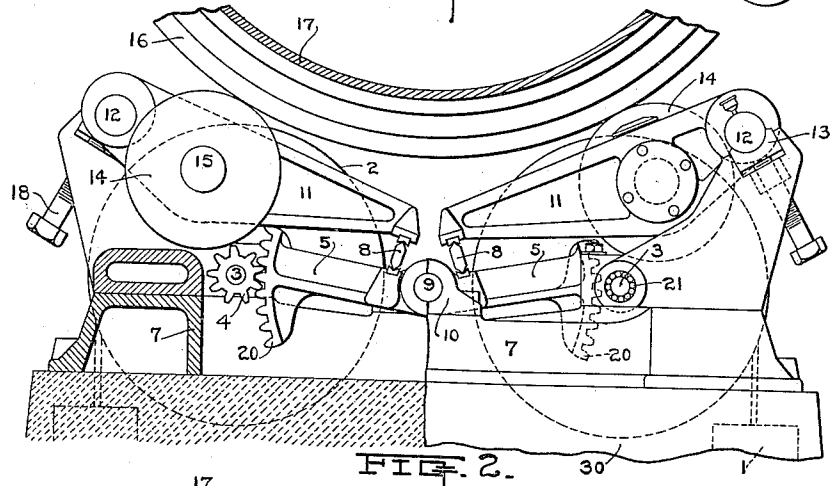


FIG. 2.

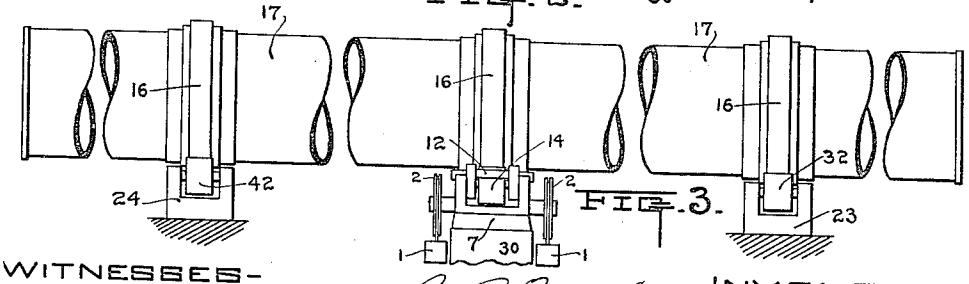


FIG. 3.

WITNESSES-

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AUTOMATIC SUPPORT FOR ROTARY KILNS.

1,146,590. Specification of Letters Patent. Patented July 13, 1915.

Application filed September 19, 1912. Serial No. 721,320.

To all whom it may concern:

Be it known that RAY C. NEWHOUSE, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, has invented a certain new and useful Improvement in Automatic Supports for Rotary Kilns, of which the following is a specification.

This invention relates to the construction of rotary kilns and especially to a means for supporting very long rotary shells of kilns or similar devices.

The object of the invention is to provide an automatic self-adjusting support for rotary kilns, which is simple in construction and efficient in operation.

In constructing rotary kilns having great length, it has been found that the two end supports customarily used on short kilns, are not sufficient to sustain the immense weight of the kiln without permitting undue deflection. It has furthermore been ascertained that a rigid intermediate support is not satisfactory since the warping of the long kiln causes the body thereof to leave the support during portions of the rotation of the kiln, thereby throwing undesirable stresses upon the end supports during a portion of each revolution. With the present invention, at least one of the three or more supports of a long kiln or similar device, is made capable of automatically adjusting itself to retain a uniform bearing with the kiln shell no matter what position the kiln may take.

A clear conception of an embodiment of the invention may be had by referring to the drawing accompanying and forming a part of this specification, in which like reference characters designate the same or similar parts in the various views.

Figure 1 is a top view of a self-adjusting support for rotary kilns. Fig. 2 is a side, part sectional, elevation of a self-adjusting rotary-kiln support having the front sheave and weight on the right, removed, and the section being taken on the line II—II of Fig. 1. Fig. 3 is a fragmentary side elevation of a very long kiln, showing a self-adjusting support applied thereto.

The shell 17 of the kiln or similar device, is cylindrical in form and has a series of concentric tires 16 secured to its outer surface at the various portions along the length of the kiln, at which it is desired to support the shell 17, see Fig. 3. Each of the end supports for the shell 17, consists of a pair of spaced rollers 32, 42, rotatably supported in stationary supporting frames 23, 24 respectively, in the usual manner. The shell 17 is adapted to be rotated in the usual manner during normal operation of the device, the means for producing such rotation having been omitted from the disclosure since it forms no part of the present invention and is well known to those skilled in the art.

The automatically adjustable support, which is the subject of the present invention, is disclosed as an intermediate support in Fig. 3, but may be substituted for any of the stationary supports along the shell 17. The automatically adjustable support consists essentially of a pair of rollers 14 adapted to coact with the surface of one of the tires 16 of the shell 17, along different elements, see Figs. 1 and 2. Each of these rollers 14 is carried by a shaft 15 which is rotatably supported in suitable bearings in the levers 11 and intermediate the ends of these levers 11. The levers 11 are fulcrumed on pins 12 supported in adjustable bearing boxes 13 carried by the stationary frame 7. The boxes 13 are adjustable in the frame 7 by means of adjusting bolts 18. Knife edges 8 coact with the adjacent power ends of the levers 11 and coact with their opposite edges against the mid-portions of the individual levers 5. The individual levers 5 are fulcrumed on the common shaft 9, supported in bearings 10 carried by the frame 7. The opposite power ends of the levers 5 are provided with gear teeth 20 forming gear segments having the axis of the shaft 9 as a center. The pinions 4 mesh with the gear teeth 20 of the levers 5, and are carried by the shafts 3. The shafts 3 are supported in roller bearings 21 formed in the frame 7, and have overhanging ends to each of which a sheave 2 is secured. The weights 1 are suspended from cords which are secured to the sheaves 2, and tend to rotate the sheaves 2, carried by one of the shafts 3 in a clockwise direction, and those carried by the other shaft 3 in an anti-clockwise direction. The entire structure is supported on a suitable foundation 30 which is cut away to permit unobstructed vertical motion of the weights 1. With this construction of supporting bearing, it should be noted, that the weights 1

tend, at all times, to maintain coaction between the rollers 14 and the tire 16. By referring, for example, to the mechanism on the right of Figs. 1 and 2, the weights 1 tend to rotate the sheaves 2 in a clockwise direction. If for any reason, the tire 16 is lifted away from the roller 14, the sheaves 2 are rotated by the weights 1, causing the pinion 4 to rotate in a clockwise direction and oscillating the lever 5 about its fulcrum shaft 9 in an anti-clockwise direction. This motion of the lever 5, lifts the knife-edge 8 and moves the work end of the lever 11 upwardly. The upward motion of the work end of the lever 11 causes this lever to move in a clockwise direction about the fulcrum pin 12 and to lift the roller 14 until it again coacts with the tire 16. The motion of the roller 14 continues until the upward pressure of the roller 14 and the resistance offered by the tire 16 are equalized. The action of the mechanism on the left is analogous to that of the mechanism just described, the motions of the rotating parts being opposite to those of the elements just described. If the tire 16 is forced in a downward direction, subjecting the rollers 14 to a greater pressure than the resistance offered by the weights 1 and the intermediate mechanism, the weights move upwardly to accommodate the downward pressure on the rollers 14. It will thus be seen that the self-adjusting supporting bearing at all times forms a uniform support for the shell 17 and automatically maintains the resisting bearing pressure constant no matter what the position of the shell 17 may be, within predetermined limits.

The device has extreme utility in supporting very long shells of kilns or similar devices in which the portions of the shells 17 sometimes get out of alinement due to the uneven heating and enormous self-contained weight of the parts. In such devices it is often desirable to provide more than two supports and to have the portion of the load carried by each support, equal. It will be noted that with the incorporation of the present invention, the load can be very evenly distributed over a plurality of bearings, and that the device will moreover automatically maintain a proportionate distribution of the load in cases where the alinement of the shell is disturbed.

It should be understood that it is not desired to be limited to the exact details herein disclosed as obvious modifications may occur to a person skilled in the art.

It is claimed and desired to secure by Letters Patent,—

1. In a kiln, a shell having an axis, a pair of end supports and an intermediate support for said shell, said intermediate support comprising a pair of rollers in contact with said shell, a pair of levers each having one of said rollers supported intermediate its ends, said levers being arranged transversely to the axis of said shell, and means for shifting each of said levers to change the position of the roller carried thereby, the shifting of one of said levers being independent of the shifting of the other.

2. In a kiln, a shell having an axis, a supporting roller in contact with said shell, a lever, intermediate the ends of which said roller is supported, said lever being arranged transversely to the axis of said shell, a second lever intermediate the ends of which an end of said first mentioned lever is supported, a gear segment secured to an end of said second lever, a pinion meshing with said gear segment, and means for rotating said pinion whereby said levers are shifted to change the position of said roller.

3. In a kiln, a shell, a supporting roller in contact with said shell, a lever intermediate the ends of which said roller is supported, a second lever intermediate the ends of which an end of said first mentioned lever is supported, a gear segment secured to an end of said second lever, a pinion meshing with said gear segment, and means for rotating said pinion whereby said levers are shifted to change the position of said roller.

4. In a kiln, a shell having an axis, a supporting roller in contact with said shell, a lever intermediate the ends of which said roller is supported, said lever being arranged transverse to the axis of said shell, a second lever intermediate the ends of which an end of said first mentioned lever is supported, and means for shifting said levers to change the position of said roller.

5. In a kiln, a shell, a supporting roller in contact with said shell, a lever intermediate the ends of which said roller is supported, a second lever intermediate the ends of which an end of said first mentioned lever is supported, and means for shifting said levers to change the position of said roller.

6. In a kiln, a shell having an axis, a supporting roller in contact with said shell, a lever intermediate the ends of which said roller is supported, a second lever coöperating with an end of said first mentioned lever, said levers being arranged transversely to the axis of said shell, and means for shifting said levers to change the position of said roller.

7. In a kiln, a shell, a supporting roller in contact with said shell, a lever intermediate the ends of which said roller is supported, a second lever coöperating at its mid portion with an end of said first mentioned lever, and means for shifting said levers to change the position of said roller.

8. In a kiln, a shell having an axis, a supporting roller in contact with said shell, a lever intermediate the ends of which said roller is supported, said lever being ar-

ranged transversely to the axis of said shell, means for automatically shifting said lever to change the position of said roller, and manually operable means for permitting adjustment of said lever.

9. In a kiln, a shell having an axis, a supporting roller in contact with said shell, a lever by which said roller is supported, said lever being arranged transversely to the axis of said shell, means for automatically shifting said lever to change the position of said roller, and manually operable means for permitting adjustment of said lever.

In testimony whereof, the signature of the inventor is affixed hereto in the presence of two witnesses.

RAY C. NEWHOUSE.

Witnesses:
H. C. CASE,
ELLA BRICKELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."