J. R. WYATT.

TILTING MECHANISM FOR FURNACES AND THE LIKE.

APPLICATION FILED JULY 9, 1920.

1,432,007. Patented Oct. 17, 1922.

2 SHEETS—SHEET 1.

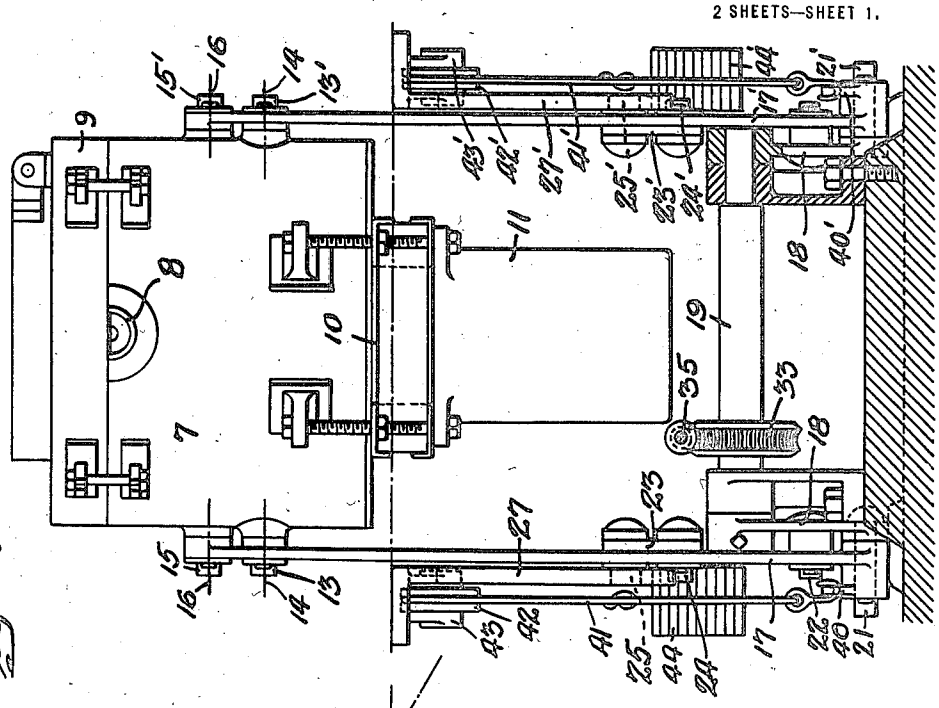


Fig. 2.

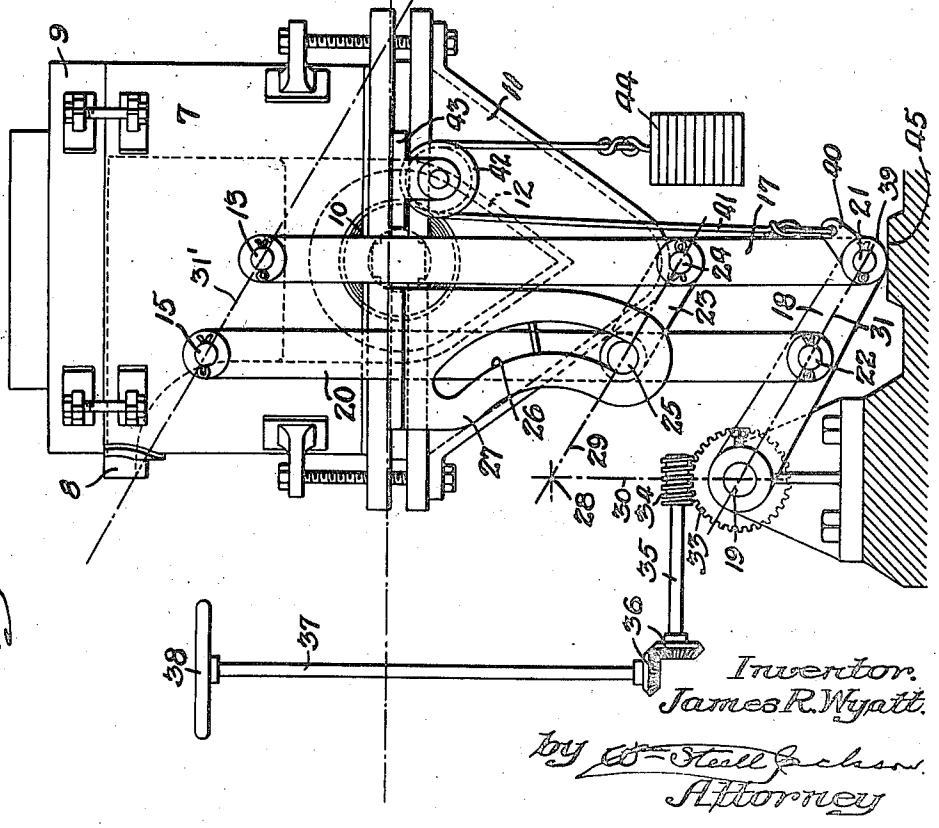


Fig. 1

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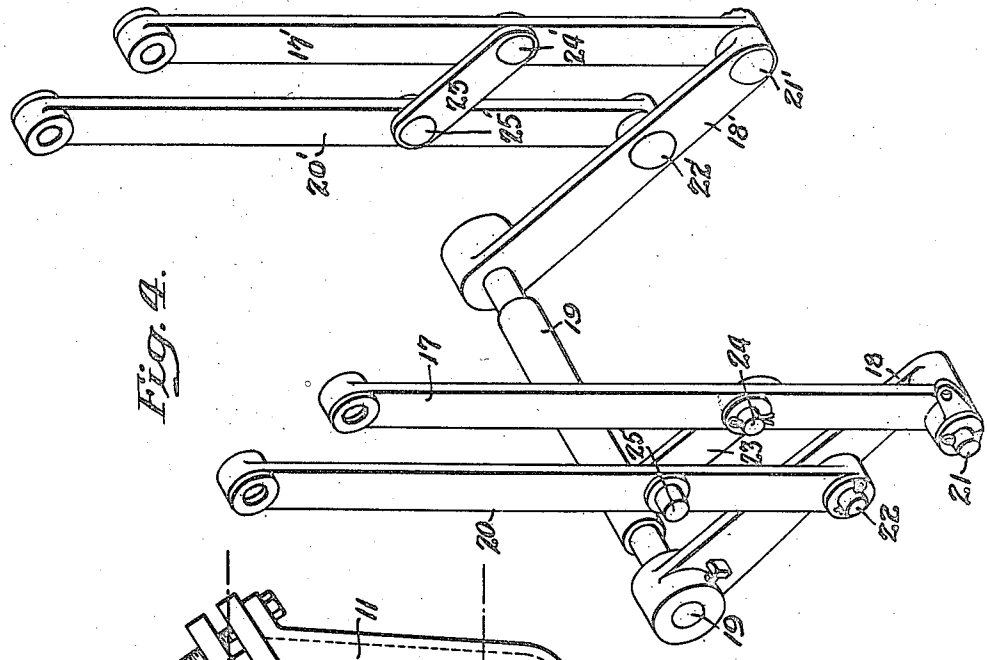


Fig. 4.

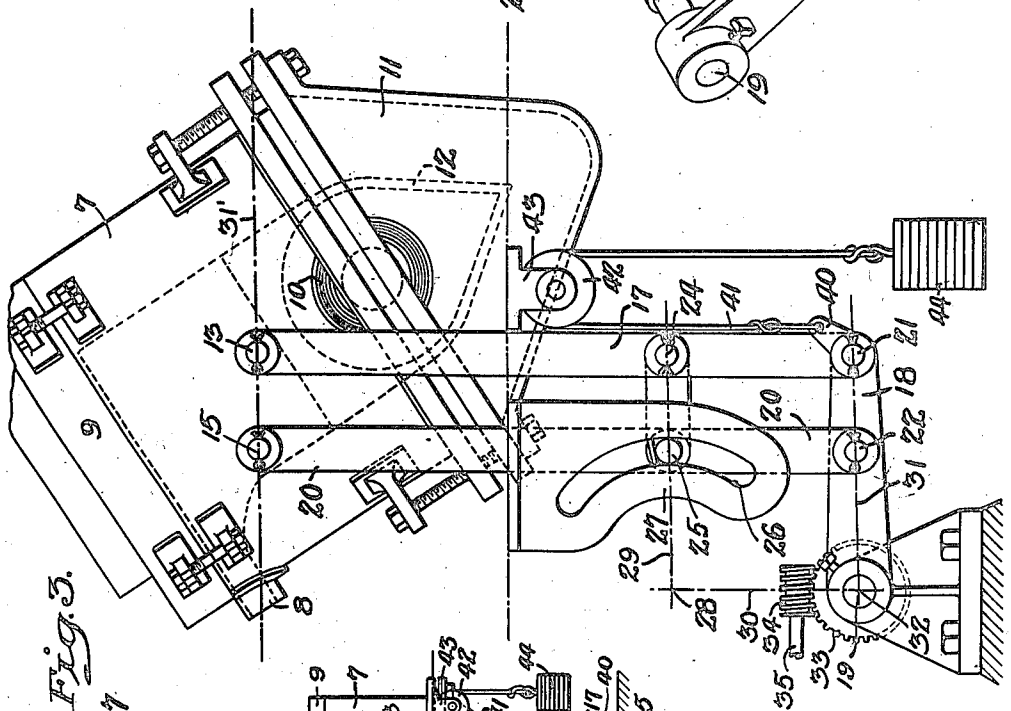


Fig. 3.

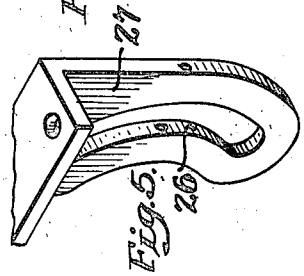


Fig. 5.

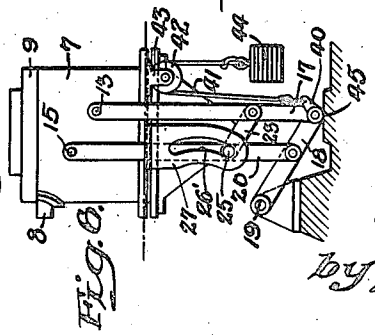


Fig. 6.

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Patented Oct. 17, 1922. 1,432,007

UNITED STATES PATENT OFFICE.

JAMES R. WYATT, OF CAMDEN, NEW JERSEY, ASSIGNOR TO THE AJAX METAL COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

TILTING MECHANISM FOR FURNACES AND THE LIKE.

Application filed July 9, 1920. Serial No. 394,893.

To all whom it may concern:

Be it known that I, JAMES R. WYATT, a citizen of the United States, residing at 1257 Empire Avenue, Camden, in the county of Camden and State of New Jersey, have invented a certain new and useful Tilting Mechanism for Furnaces and the like, of which the following is a specification.

My invention relates to mechanism for supporting and tilting electric furnaces, coming within the general invention disclosed in my application for patent for tilting mechanism for containers, such as furnaces, Ser. No. 261,670, filed November 8, 1918.

The purpose of my invention is to provide parallel arm support and tilting and at the same time free the front of the furnace as much as possible from interference therefrom.

A further purpose is to place parallelogram tilting mechanism back from the furnace spout and tilt it by mechanism conveniently located at the front thereof.

A further purpose is to remove the counterbalance for a furnace tilting mechanism from the front of the furnace.

Further purposes will appear in the specification and in the claims.

I prefer to explain my invention in connection with but one general form thereof, selecting a form which has proved to be practical, efficient and thoroughly reliable and at the same time well illustrates the principles of my invention.

Figure 1 is a side elevation of a furnace tilting mechanism exhibiting my invention.

Figure 2 is a front elevation partly sectioned, of the structure of Figure 1.

Figure 3 is a view similar to Figure 1 showing the parts in pouring position.

Figure 4 is a detached perspective view of the tilting levers and shaft therefor.

Figure 5 is a broken perspective of a guide shown in Figures 1, 2 and 3.

Figure 6 is a side elevation showing a slight modification of the same general structure.

In the drawings similar numerals indicate like parts.

The furnace 1, by which I have illustrated my invention, is of the same general type as the furnace of my Patent No. 1,201,671, dated October 17, 1916, and comprises a body 7, pouring spout 8, cover structure 9, transformer 10 and lower casing 11 for a resistor secondary 12. At any suitable point on opposite sides of the body I provide pairs of pins, 13, 13′ and 15, 15′ of which the pair 13, 13′ are desirably located approximately in line with an axis 14 through the center of gravity of the operating furnace with a normal charge, and 15, 15′ center in a line 16 parallel to 14. That the line through the centers of pins 13, 13′ should pass near the center of gravity is not essential however, and in Figure 6 I have shown the pins 13, 13′ as spaced to the right and pins 15, 15′ as spaced to the left, respectively of a vertical line through the center of gravity of the furnace, this figure being otherwise intended to illustrate the same structure as shown in the other figures.

The shifting mechanism comprises a parallelogram or lazy tongs arrangement shown most clearly in Figure 4 and in which the main weight of the furnace, in the preferred figures, is taken by supports or bars 17, 17′ connecting with the pins 13, 13′ and lifted by arms 18, 18′ upon shaft 19. In this preferred form the tilting is accomplished by bars 20, 20′ which connect at the upper ends with pins 15, 15′. In the form in Figure 6 the pairs of bars 17, 17′ and 20, 20′ divide the weight about equally and both take part about equally in the tilting of the furnace as it is lifted.

The pairs of bars 17, 17′ and 20, 20′ are pivotally connected with the arms 18, 18′ by pins 21, 21′ and 22, 22′ respectively, and the bars on the same side of the furnace, 17 and 20 or 17′ and 20′ may be further connected for stiffening purposes by straps 23, 23′ through pins 24, 24′ and 25, 25′ respectively.

Whether the straps 23, 23′ be used or not, my invention contemplates providing pins upon or connected with the bars of one pair either 17 and 17′ or 20 and 20′ (and in this case conveniently the pins 25) to cooperate with cam slots 26 in brackets 27 fixedly supported close to the bars, whereby the bars of one pair at least are restrained laterally and caused to follow substantially the same path as they would follow if the straps 23 were projected to pivot about an axis 28 through the intersections of the lines 29, the center lines of straps 23, with the vertical lines 30 through the ends of shaft 19. In the best

form of my invention the planes through line 30 and shaft 19, and the axes 14 and 16, respectively, meet in a line passing approximately through the pouring spout and the line 29 is parallel with line 31 (through shaft 19 and pins 21, 22) and line 31′ (through axes 14 and 16).

By using the cam guide instead of the actual extension of the straps 23 to a pivot 28, I clear the space at the front of the furnace and give more room for moulds or other mechanism, much simplifying the handling of the product without losing desirable control over movement of the furnace. Any guide which will maintain the bars 17, 17′, 20 and 20′ in substantially parallel (preferably vertical) positions during their movements will serve the purpose.

In order that the furnace may be tilted to advantage by a single operator and without danger of reversal as the weight in the furnace is reduced by pouring, I tilt by a worm wheel 33 upon shaft 19. The worm wheel is turned by a worm 34 and operated through shaft 35, gearing 36, and spindle 37 by a wheel 38.

In order to avoid complication of structure in front of the furnace, I shift the counterbalance from the position shown in my above mentioned application, upon an extension of the lever arms 18 to the left beyond the shaft 19 and cause the counterweights to lift the ends 39 of the arms 18, forming the connection by clips 40 and cord 41 passing about pulley 42 in hanger 43 to the weights 44.

Excessive downward movement of the furnace and of the lifting mechanism is restrained by blocks 45 upon which the arms or bars bottom.

In operation the furnace is tilted through the counter-clockwise turning of arms 18, 18′ lifting the furnace through bars 17, 17′ or through the combined lifting effort of these and arms 20, 20′, the former pair of which perform the chief lifting operation in the preferred form but may assist in the tilting, and the latter pair of which tilts or assists in tilting the furnace without or with effective assistance in the support of the furnace.

In the meantime the furnace is prevented from side movement by the guiding of one pair of arms through the cam guides 26 and the structure may be stiffened by straps 23. Counterweighting is effected by weights 44.

Though I have illustrated but one general form, I am aware that the advantage of all or a part of my invention may be obtained by other applications of it which will appeal to those skilled in the art as suiting the whim of the designer or the needs of individual installations or types of installation. I am also aware that the benefits of my invention are not limited to furnaces but that the invention may be applied to other containers in great variety.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In lifting and tilting mechanism for furnaces, a furnace, a pair of parallel bars on each side of the furnace and pivoted to it, connections therebetween to maintain parallelism with lifting movements of the bars, arms and mechanism connected therewith for lifting the bars and a cam guide and connections for maintaining the bars against lateral movement.

2. In lifting mechanism for furnaces, a furnace, two pairs of parallel bars, one on each side of the furnace and pivotally connected at their ends to the furnace, in combination with a pair of lifting and tilting lever arms pivotally connected with the bars to form quadrilaterals with the bars, furnace connections and arms, and a guide for each pair of bars, maintaining them against lateral movement throughout the normal path of movement of the bars.

3. In lifting mechanism for furnaces, a furnace, two pairs of parallel bars, one pair on each side of the furnace and pivotally connected therewith, two operating lever arms, one on each side, pivotally connected with the bars, movable guide members, one on each side of the furnace and carried by the bars, a fixed guide member cooperating therewith to maintain the supports in upright position, forming parallelogram systems and counterweighting mechanism for the systems, comprising a flexible connection secured to the system at one end, a pulley for the flexible connection and a counterweight upon the end of the flexible connection.

4. In a lifting and tilting mechanism for furnaces, a furnace, a pair of parallelogram lifting and tilting systems on opposite sides of the furnace and counterweighting mechanism for the systems, comprising a flexible connection secured to the system at one end, a pulley for the flexible connection and a counterweight upon the end of the flexible connection.

5. In a lifting and tilting mechanism for furnaces, a furnace, two pairs of parallel bars, one pair each located on opposite sides of the furnace and pivotally connected therewith, a pair of lifting arms each pivoted at one end to the bars, mechanism connected with said bars to swing the same, guides to maintain the bars in vertical position throughout their movement and counterweighting mechanism for the system connected to the arms at a distance from the pivots.

6. In a lifting and tilting mechanism for furnaces, a furnace, two pairs of lifting and

tilting bars, one pair on each side of the furnace and pivotally connected therewith, lifting arms for said bars pivotally connected therewith to maintain parallelism of the bars, pins connected one with a bar on each side of said furnace, a fixed cam plate on each side guiding said pins and counterweighting mechanism for the furnace.

7. In a lifting and tilting mechanism for furnaces, a furnace, two pairs of bars for lifting and tilting the furnace, one pair on each side of the furnace and pivotally connected therewith, lifting arms for said bars, pivotally connected therewith to maintain parallelism of the bars, one bar of each pair being so pivoted as to lift practically in line with the center of gravity of the furnace with a moderate pool, pins connected one with a bar on each side of said furnace, a fixed cam plate on each side guiding said pins and counterweighting mechanism for the furnace.

8. A parallelogram lifting and tilting mechanism for furnaces, a furnace comprising a parallelogram mechanism on each side in combination with counterweighting mechanism operating directly upon the parallelograms and lifting mechanism for the parallelograms.

9. In a tilting mechanism for furnaces, a furnace, in combination with quadrilateral lifting and tilting mechanisms of which the furnace forms one side of each, lever arms, one forming the side opposite to the furnace side of each and extended beyond the quadrilateral forwardly toward the pouring spout to a pivot point substantially below the pouring spout, means for turning the arms about their pivots, guides for the bars of the quadrilateral which join the furnace and lifting arms, maintaining the arms in parallel positions and counterweighting mechanism for the weight of the furnace.

10. In a tilting mechanism for furnaces, a furnace, in combination with quadrilateral lifting and tilting mechanisms of which the furnace forms one side of each and lever arms form the sides opposite to the furnace side of each, the arms being extended beyond the quadrilateral forwardly toward the pouring spout to a pivot point located substantially below the pouring spout, means for turning the arms about their pivots, guides for the members of the quadrilaterals joining the furnace and lifting members, maintaining the arms in parallel positions, a flexible connection to each of the arms, a pulley about which it passes and counterweights upon the other ends of the flexible connections.

11. In a tilting mechanism for furnaces, a furnace, in combination with quadrilateral lifting and tilting connections of which the furnace forms one side of each and lever arms form the sides opposite to the furnace of each, said arms being extended beyond the quadrilaterals forwardly toward the pouring spout to a pivot point, means for turning the arms about their pivots, guides for the members joining the furnace and lifting arms, maintaining them in parallel positions, a counterweight, an idler and a flexible connection from the counterweight passing over the idler and adapted to lift one of the arms.

12. A furnace, pairs of vertically disposed bars pivotally connected to the furnace on opposite sides thereof, the common plane of their pivots passing approximately through the pouring spout, arms at the opposite ends of said bars, pivotally connected thereto and forming a parallelogram with the furnace connections, bars and arms, a pivotal support for said arms forward of the quadrilateral, and beneath the pouring spout, means for turning said arms to lift and tilt the furnace and cam guide connection for one of the bars on each side, maintaining said bars in substantially vertical position.

13. In a lifting and tilting mechanism for furnaces, a furnace, a parallelogram lifting and tilting mechanism upon each side of the furnace and using the furnace as one member of each parallelogram in combination with a cam guide upon each side to maintain the parallelogram against undue swinging movement.

14. In a lifting and tilting mechanism for furnaces, a furnace, a parallelogram lifting and tilting mechanism upon each side of the furnace, pins upon vertical members of the parallelogram and fixed guides for the pins.

15. In a tilting mechanism for furnaces, a furnace, a pair of parallelogram tilting mechanisms therefor adapted to tilt the furnace approximately about its pouring spout and having two members of each parallelogram approximately vertical, in combination with a guide at each side in proximity to one of the vertical members, supporting it against undue lateral movement.

JAMES R. WYATT.