June 8, 1954 A. ARUTUNOFF 2,680,609

TILTING ASSEMBLY FOR OSCILLATING MELTING FURNACES

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FIG. 1

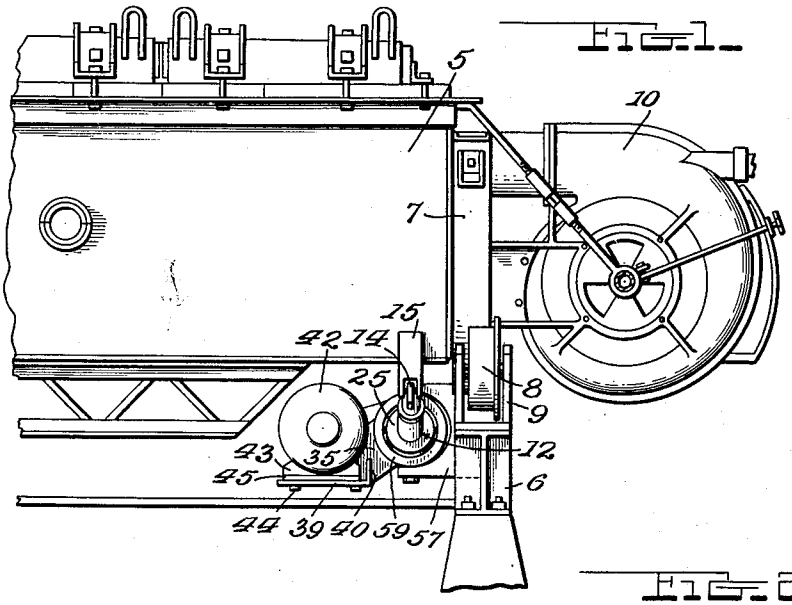
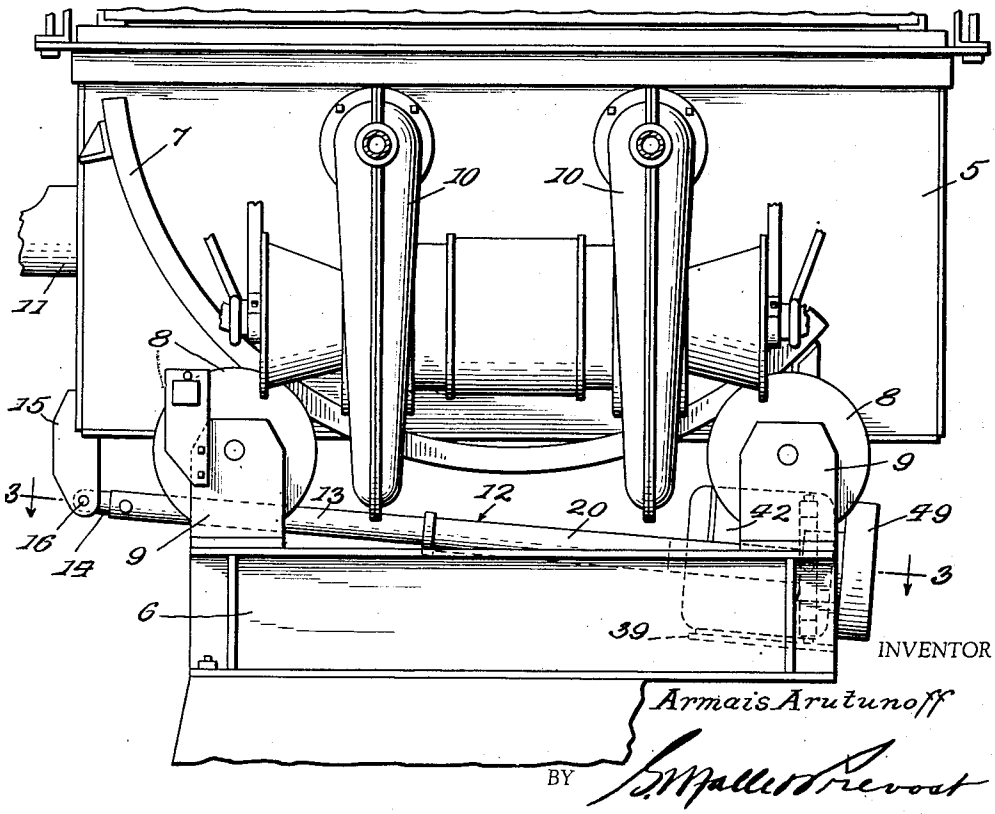


FIG. 2

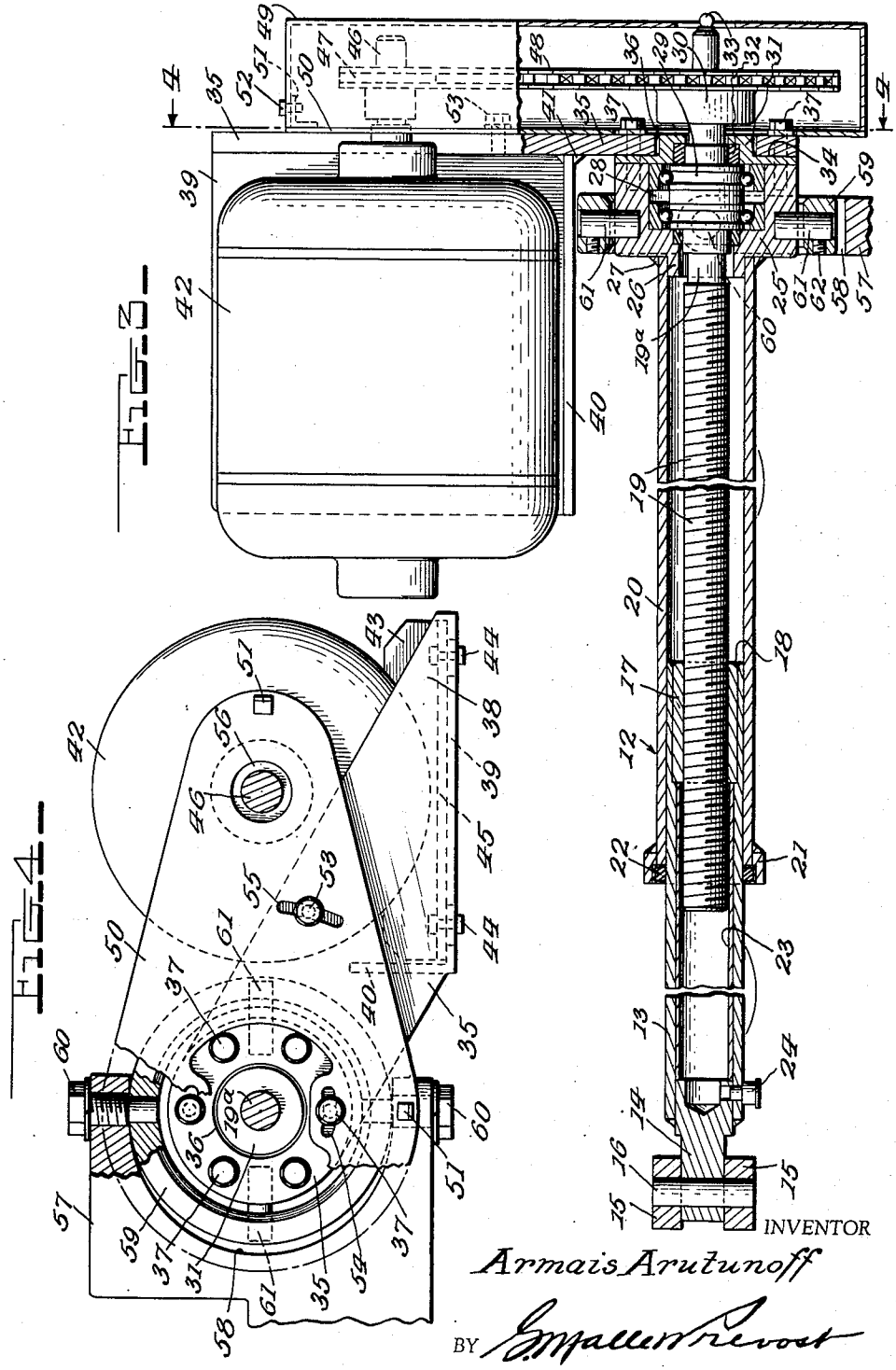


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TILTING ASSEMBLY FOR OSCILLATING MELTING FURNACES

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3 Claims. (Cl. 266—33)

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This invention relates to new and useful improvements in a tilting mechanism for melting furnaces and more particularly, oscillating furnaces of the stack-loaded, direct-fired type, such as illustrated and described in my copending application Serial No. 292,101, filed June 6, 1952.

The primary object of the invention is to provide a tilting mechanism embodying a motor-driven, screw and nut actuated unit which may be readily installed in connection with any conventional melting furnace of this general type, without necessitating any major alterations in the furnace structure.

Another object of the invention is to provide a tilting mechanism which is rugged and positive in operation and designed for minute control of action.

A further object of the invention resides in the provision of a novel and efficient tilting unit, wherein the entire assembly including the electric motor, is supported on the furnace sub-structure, and adapted to bodily rotate about a fixed horizontal axis, in compensation for the progressively changing vertical position of its point of connection to the furnace body.

A still further object of the invention is to provide a universal mounting, whereby the entire assembly is capable of pivotal movement about both horizontal and vertical axes.

Still another object of the invention is to provide a simplified mounting structure, wherein the motor and the retractable connecting rod are carried on a common supporting base which is mounted for universal movement.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Referring to the drawings in which numerals of like character designate similar parts throughout the several views,

Figure 1 is a side view of one end of an oscillating melting furnace, showing the tilting mechanism in end elevation.

Figure 2 is an enlarged end view of the furnace, showing the tilting mechanism in side elevation.

Figure 3 is a still further enlarged detailed sectional view of the tilting unit taken on line 3—3 of Figure 2, and

Figure 4 is a transverse sectional view, taken on line 4—4 of Figure 3.

In the drawings, 5 represents a melting furnace body, such for example as that described in my said copending application. The furnace body is mounted for oscillation on a frame or support 6, by means of an arcuate end track 7, which is fixed to the furnace body and movably supported on a pair of flanged rollers 8, rotatively mounted in upstanding bearing brackets 9 on the main furnace support 6. It will of course be understood that a second track and roller support is arranged at the opposite end of the furnace.

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At one end of the furnace, a burner-blower assembly 10, is mounted directly on the furnace shell and oscillates therewith, all as described in my said copending application.

My improved tilting unit for causing the oscillation of the furnace body 5 on the rollers 8, both during the melting process and when pouring molten metal from spouts 11, includes an extendable and retractable connecting rod, generally designated by the numeral 12, interposed between a prime mover, located at a fixed point on one side of the furnace frame 6 and a connecting point on the opposite side of the furnace body. As will best be seen in Figure 3, the connecting rod assembly consists of a tubular member 13, having a connecting link 14 at one end, pivotally secured to the lower end of a bracket 15, depending from the lower edge of one side wall of the furnace body 5, a pivot pin 16 passing through registering openings in the bracket and link, as shown.

The opposite end of the tubular member 13 carries an internal nut 17 which is preferably set in an annular recess in the end of the tube and welded in place as at 18, to maintain its fixed relation to the tube 13. The nut 17 is threaded to engage complementary threads on a screw member 19 which constitutes the power-driven member of the assembly and is operatively connected to the prime mover, as will later appear.

A concentric, tubular housing 20 encloses the screw member 19 and its inside diameter is such as to telescopically receive the nut end of the tube 13 which is thus longitudinally retractable and extendable by the screw 19, in the operation of the device. The end of the housing is equipped with a collar 21, and within the latter, a sealing ring 22 embraces the outer wall of the retractable tube 13.

Preferably, the retractable tube is provided with a suitable liner tube 23 which extends from the outer end of the tube 13 to the nut 17, a lubricating fixture 24 at the end of the tube 13, enabling the proper lubrication of the connecting rod assembly, as shown.

The base end of the housing 20 is mounted on a base member 25, by means of a short cylindrical flange 26 which fits closely within the end of the housing, and the latter is preferably welded to the base as at 27, to insure a rigid connection.

The base 25 is recessed as at 28, to receive a roller bearing assembly 29, by means of which the inner end of the shaft 19a of the screw 19, is rotatably mounted in the base. The end of the screw shaft extends entirely through the base

and has keyed or otherwise fixed thereon, a chain sprocket 30 for connection to the prime mover. A retainer 31 and an annular seal 32, embrace the end of the screw shaft and a suitable lubricating fitting 33 may be provided in the end of the shaft for introducing a lubricant into the recess 28 and housing 20.

The outer face of the retainer 31 is annularly recessed as at 34 to receive a motor supporting arm 35, an opening 36 being provided in the latter to accommodate the retainer and the projecting end of screw shaft 19a. A series of bolts 37 pass through the arm 35 and retainer 31 and into the base 25 to firmly secure the arm to the base.

As will be seen from Figure 4, the motor supporting arm 35 is directed at a downward angle and terminates in a tapered end 38 which supports a horizontal motor platform 39, extending inwardly at right angles thereto. This platform has an upstanding rear wall 40, the inner end of which, together with the corresponding edge of the platform, is welded to and adjacent face of supporting arm 35, as shown at 41 (Fig. 3).

A horizontal electric motor 42, having a base 43, is mounted on the platform 39 by means of bolts 44 which engage connecting flanges 45 on the motor base. The motor shaft 46 is extended to receive a drive sprocket 47, aligned with sprocket 30 on screw shaft 19a and a drive chain 48 operatively connects the two sprockets. A guard housing 49 covers the two sprockets and connecting chain and is fastened to a guard back 50 by means of angle brackets 51 and 52. The guard back 50 is preferably secured to the motor supporting arm 35 by certain of the bolts 37 and an intermediate bolt 53 which respectively extend through suitable adjusting slots 54 and 55. An opening 56 permits passage of the motor shaft 46 through the guard back 50.

Mounting of the tilting assembly on the furnace base, is accomplished by means of a universal yoke 57 which is rigidly supported on the base 6 of the furnace and projects horizontally under one end of the furnace body as shown in Figure 1. The free end of this yoke is formed with a vertically arcuate recess 58, adapted to receive a universal ring 59, which surrounds the base 25 of the tilting assembly. A pair of pivot screws 60 secure the ring 59 to the yoke 57, for pivotal movement about a vertical axis in the arcuate recess 58, as will be seen from Figure 4. Pivotal movement of the tilting mechanism about a horizontal axis, is afforded by means of a pair of pivot pins 61 which are locked in openings in the ring by set screws 62 and rotatably engage complementary openings in the base 25, as seen in Figure 3.

With this arrangement it will be seen that for operatively aligning the connecting rod 12 with the furnace bracket 15, the entire assembly may be shifted laterally about the vertical axis of pivot screws 60 and as the tilting mechanism operates to retract the tubular member 13 and lower the connected edge of the furnace body 5, the tilting assembly pivots about the horizontal axis of pivot pins 61.

In operation, when it is desired to tilt the furnace body 5 either for oscillation during the melting process or for pouring the molten metal at the conclusion of the melting step, the electric motor is energized by means of any suitable control (not shown), rotating the motor shaft 46. By means of the connecting chain 48 this rotary motion is transferred to sprocket 30 fixed on the end of the screw shaft 19a and rotation of this screw in one direction causes retraction of the tube 13 which telescopes into the end of the housing 20. The longitudinal movement of the connecting tube 13 draws with it the link 15 and tilts the spout side of the furnace body 5 and during this operation, the entire connecting rod assembly pivots about the axis of the pivot pins 60. The reverse operation of the motor 42 obviously returns the furnace body to its original horizontal position.

It will thus be seen that I have provided a compact and efficient tilting mechanism having a universal connection to the furnace structure which compensates for various movements and adjustments both in the assembly and in the operation of the unit.

From the foregoing it is believed that my invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of the invention as set forth in the following claims.

I claim:

1. A tilting mechanism for melting furnaces of the type including a furnace body, mounted for pivotal movement about a horizontal axis; said tilting mechanism, comprising a fixed support, a universal ring, pivoted in said support for swinging movement about a vertical axis, an annular base member pivoted in said ring, for swinging movement about a horizontal axis, a motor supporting arm fixed to said base and projecting laterally therefrom, an electric motor carried by said arm, a screw and nut actuated retractable connecting rod assembly, concentrically supported at one end by said base with its opposite end operatively connected to said furnace body, and a driving connection between said motor and connecting rod assembly.

2. Apparatus as claimed in claim 1, including a horizontal motor supporting platform, fixed to said arm and means for securing a horizontal motor thereto.

3. A tilting mechanism for melting furnaces of the type including a furnace body, mounted for pivotal movement about a horizontal axis; said mechanism comprising a fixed support, an internally unobstructed universal ring, pivoted in said support for swinging movement about a vertical axis, an annular base member pivoted in said ring, for swinging movement about a horizontal axis, a substantially vertical motor-supporting plate fixed to and extending radially from said base, a horizontal platform fixed to said plate, an electric motor mounted on said platform, a screw and nut actuated retractable connecting rod assembly, concentrically supported at one end by said base with its opposite end operatively connected to said furnace body, and a driving connection between said motor and connecting rod assembly.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
274,055	Thomas	Mar. 13, 1883
1,273,289	Urschel	July 23, 1918
1,678,455	Allen	July 24, 1928
2,202,224	Moore	May 28, 1940
2,455,531	Strohman	Dec. 7, 1948
2,481,699	Strohman	Sept. 13, 1949
2,513,050	Pugh	June 27, 1950