T. V. FOWLER, JR.

STIRRING MECHANISM FOR CHEMICAL FURNACES.

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1,184,339.

Patented May 23, 1916.

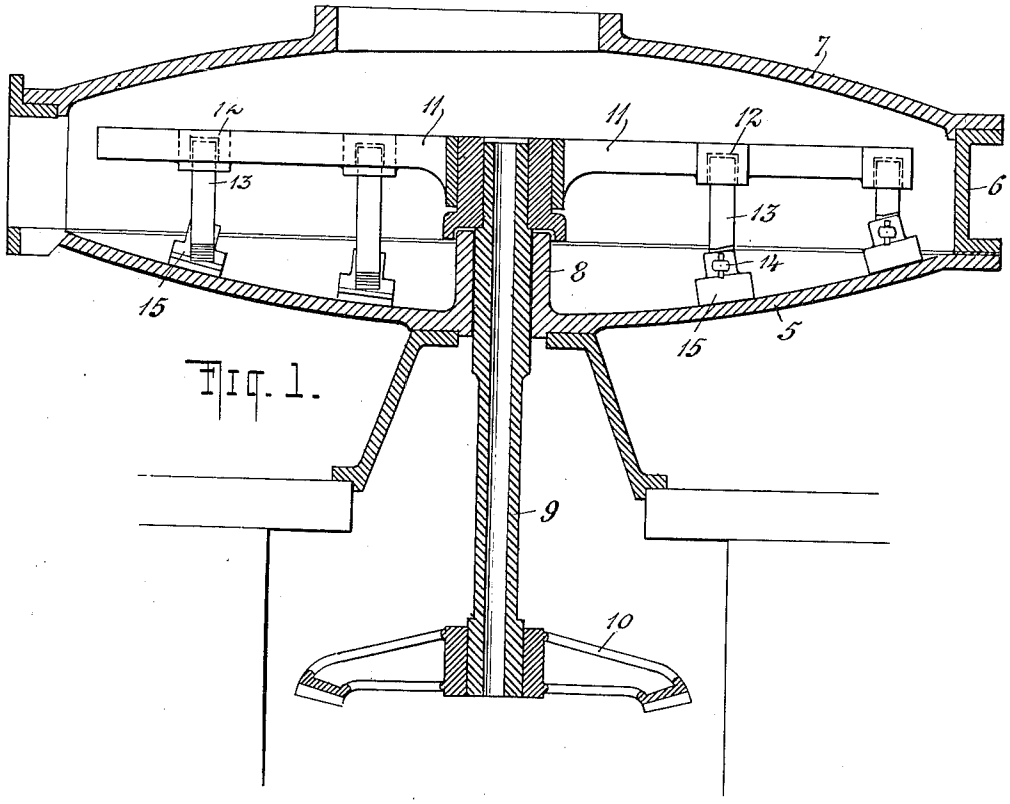


FIG. 1.

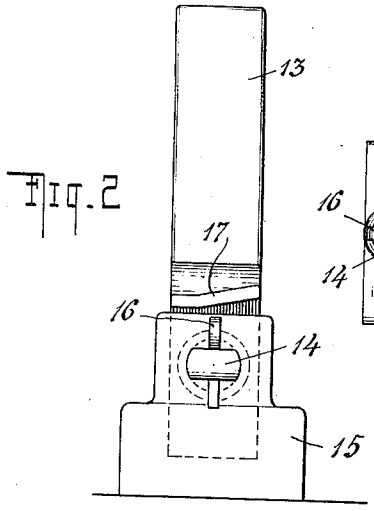


FIG. 2.

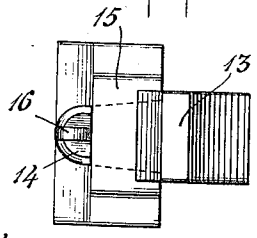


FIG. 4.

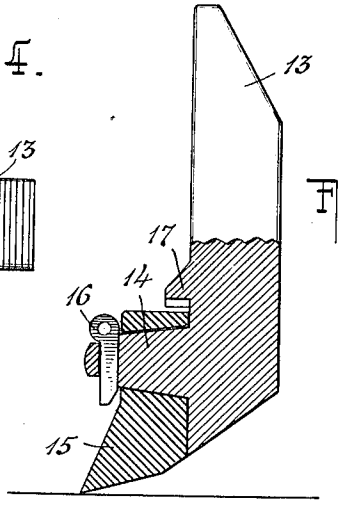


FIG. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

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STIRRING MECHANISM FOR CHEMICAL-FURNACES.

1,184,339. Specification of Letters Patent. Patented May 23, 1916.

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To all whom it may concern:

Be it known that I, THEODORE V. FOWLER, Jr., a citizen of the United States, and a resident of the borough of Manhattan, city and State of New York, have invented certain new and useful Improvements in Stirring Mechanisms for Chemical-Furnaces, of which the following is a specification.

My invention relates to stirring mechanisms for chemical apparatus, such as the well known Mannheim calcining or decomposing furnace illustrated in United States Letters Patent No. 726,911, dated May 5, 1903, and has for its principal object to provide in a stirring mechanism a tooth which is so constructed and mounted that it is capable of automatically conforming to the surface irregularities or curvatures of the furnace floor in scraping contact with which it is adapted to be driven for the purpose of stirring and mixing the materials undergoing treatment upon said floor.

Another object of my invention is to provide in a stirring mechanism teeth of substantially identical construction, each tooth being adapted to scrape properly along any path upon said floor; this feature has particular application in connection with furnaces, such as the Mannheim furnace above referred to, the treating floors of which are concave or otherwise curved, in which furnaces a variety of teeth having cutting edges at different angles has heretofore been necessary.

Other objects of my invention will hereinafter be pointed out or will otherwise appear in connection with the following description of the embodiment of my invention shown in the accompanying drawings in which—

Figure 1 is a vertical section of portions of a Mannheim furnace provided with my improved stirring mechanism, Fig. 2 is an enlarged front elevation of the stirring tooth shown in Fig. 1, Fig. 3 is a side elevation, partly in section, of the tooth shown in Fig. 2, and Fig. 4 is a plan view of the tooth shown in Figs. 2 and 3.

The furnace proper, as shown in Fig. 1, is of the well known muffle construction and comprises a floor 5 of concave form upon which the material to be calcined or otherwise treated is placed, the mantle 6 and the cover 7. Proper openings are provided for the admission of materials, and the discharge of solid and gaseous products. Extending through the hub 8 of the floor 5 is a vertical driving shaft 9 provided exteriorly of the furnace with means for rotating the same, such means being represented by the gear 10. The driving shaft is connected within the furnace with horizontal driving arms 11, preferably four in number, the connection between the shaft and arms and the hub 8 being such as to insure a gas-tight bearing permitting of the rotation of the shaft and the arms.

Each driving arm is provided with a plurality of apertures or sockets 12 opening from below, into which sockets the upper ends of the stirring teeth are inserted, a telescopic, slidable connection being thus established between the arms and the teeth, whereby the teeth, resting by their weight upon the floor 5 so as to be supported thereby and being thus in scraping contact therewith are driven by the arms in circular paths about the axis of the shaft 9. The sockets 12 are spaced at varying distances from the axis of rotation so that the teeth inserted in the pockets move each in a path different from the paths of the other teeth. Moreover, these sockets, and by them the teeth, are so distributed along the arms that substantially the whole surface of the floor is passed over by the teeth during each revolution of the shaft and consequently the whole mass of material being treated upon the floor is stirred.

The various teeth may be identical in construction; as shown, the only difference in construction is in the total length of the teeth, those near the periphery of the furnace being shorter than those toward the center thereof.

Each tooth consists of a holder 13, the upper portion of which is of angular cross section so as to fit into the sockets 12 which are, of course, internally of similar angular cross section, whereby the turning of the holders in the sockets is prevented. The rearward upper portion of the holder 13 is beveled so as to permit of the easy insertion of the tooth into its socket. The lower portion of the holder 13 is provided with a conical bearing 14 which projects forwardly, that is, in the direction of motion in which the tooth travels, due to its propulsion by the driving means. Upon this bearing the blade 15 of the tooth is pivotally mounted. A

locking pin 16 passing through a vertical aperture in the bearing 14 forwardly of the blade prevents the latter from becoming accidentally displaced.

A stop lug 17 extends forwardly from the holder and overhangs a part of the upper surface of the blade 15; this lug is slightly spaced from said upper surface of the blade 15 and is adapted to contact with said surface when the blade is rotated through a definite number of degrees on the axis of the bearing 14, the lug thus acting as a stop to limit the rotary movement of the blade. The end of the lug nearest the shaft 9 is lower than the opposite end of said lug whereby a lesser degree of rotation or tilting of the blade toward the shaft is permitted than toward the periphery of the furnace. Thus the blade adapts itself to the curvature of the floor, the cutting or scraping edge thereof being capable of proper contact with all portions of the curved floor, but being limited in its rotation so that it cannot become accidentally turned into a position in which it will not operate properly. The angle of tilt of the blade upon the axis formed by the bearing 14, obviously is determined by the floor; moreover, it will be seen that the axis of tilt is substantially horizontal and extends at an angle to the cutting edge of the blade, for example, at right angles to said edge, as shown, whereby the blade is tiltable in a substantially vertical plane through said edge. The holder and blade may be made of any suitable material, such as ordinary cast or wrought iron, but I prefer to make the holder of such material and the blade, where desired, of a chemical resistant material.

In the operation of the device the shaft is rotated and the teeth on the arms scrape over the floor to stir the material thereon. If one of the teeth strikes a hump or depression in the floor the blade thereof is rotated by contact with such irregularity or moves vertically or both rotates and moves vertically so as to pass over the irregularity without breakage. The limitation of the independent movement of each tooth to vertical and restricted rotary movement permits the riding over of irregularities, but at the same time sufficient frictional resistance especially to vertical movement is offered so that the effect of the blade as a cutting tool is not impaired.

I claim:

1. In a stirring mechanism, a tooth comprising a blade having a cutting edge, said blade being tiltable in a substantially vertical plane through said cutting edge.

2. In a stirring mechanism, a tooth comprising a holder and a blade having a cutting edge, said blade being pivotally mounted upon said holder, the pivotal axis being substantially horizontal and at an angle to said cutting edge.

3. In a stirring mechanism, a tooth comprising a blade having a cutting edge and adapted to move across a floor in contact therewith, said blade being tiltable in a substantially vertical plane through said cutting edge, the angle of tilt being determined by the floor.

4. In a stirring mechanism, a tooth comprising a blade adapted to move across a floor and being supported thereby, said blade being tiltable on an axis extending substantially in the direction of movement of the tooth across the floor.

5. In a stirring mechanism, a tooth comprising a holder and a blade having a cutting edge, said blade being adapted to move across a floor in contact therewith and being pivotally mounted upon said holder, the pivotal axis being substantially horizontal and at an angle to said cutting edge, the angle of tilt being determined by the floor.

6. In a stirring mechanism, a tooth comprising a holder and a blade pivotally mounted upon said holder, said holder being provided with a stop for limiting the pivotal movement of said blade.

7. In a stirring mechanism, a tooth comprising a holder and a blade having a cutting edge, said blade being pivotally mounted upon said holder, the pivotal axis being substantially horizontal and at an angle to said cutting edge, and said holder being provided with a stop for limiting the pivotal movement of said blade.

In testimony whereof, I have hereunto set my hand.

THEODORE V. FOWLER, JR.