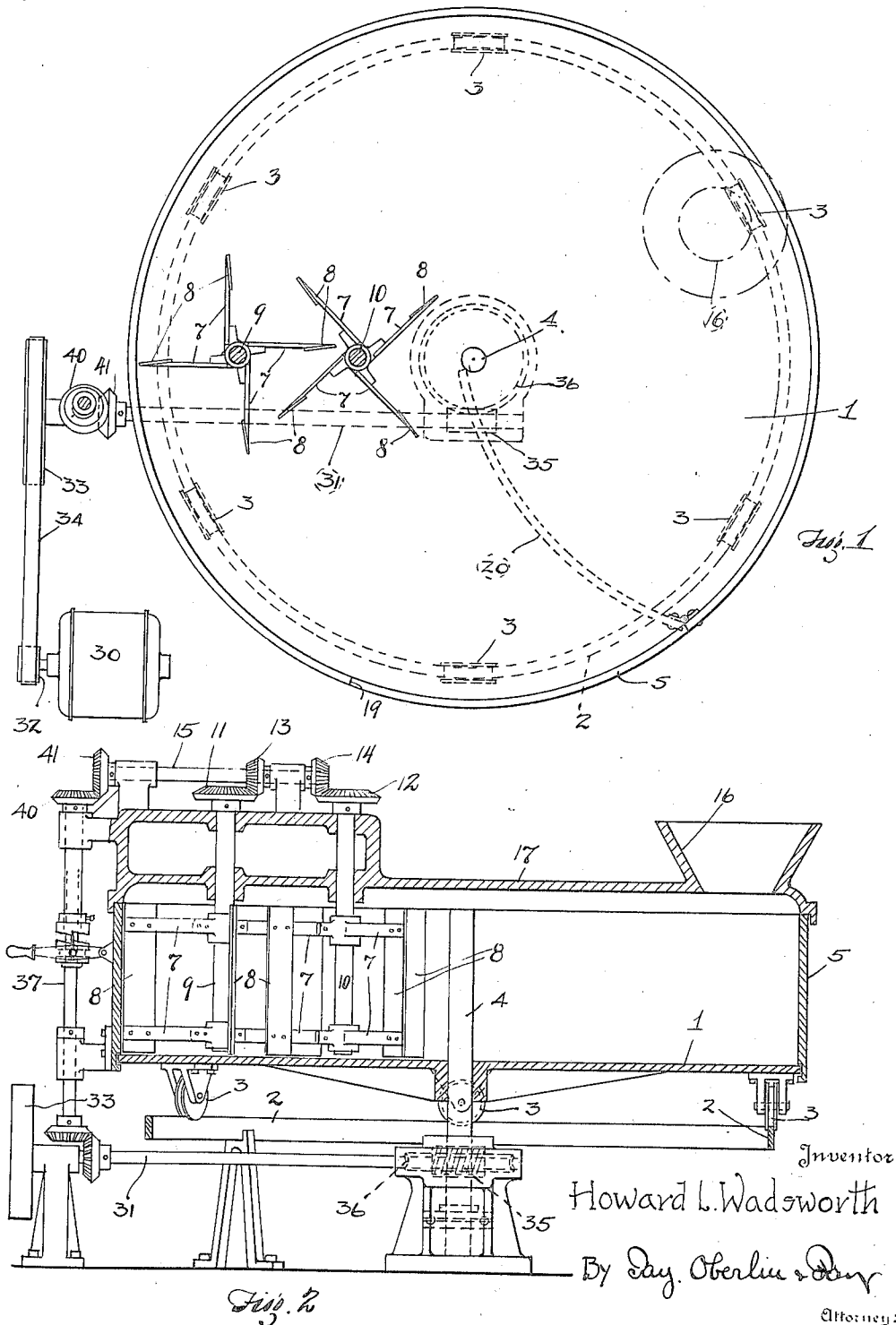


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SAND MIXING APPARATUS.
APPLICATION FILED FEB. 5, 1920.

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UNITED STATES PATENT OFFICE.

HOWARD L. WADSWORTH, OF CLEVELAND, OHIO.

SAND-MIXING APPARATUS.

Application filed February 5, 1920. Serial No. 356,493.

To all whom it may concern:

Be it known that I, HOWARD L. WADSWORTH, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Sand-Mixing Apparatus, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates to an improved sand mixing apparatus intended for the intimate mixing of the various types of sand, which are used when mixed for facing sand and core sand in foundries. At the present time it is common practice to mix the various grades of sand either by shoveling them together and then shoveling the sand over and over until a suitable mixture is secured, or by charging various kinds of sand into a large hopper, in which there are heavy revolving rolls which act to grind and mix the different types of sand together. The first method is objectionable because of the difficulty of securing laborers, and also because of the expense, while the second method involves a large investment in an apparatus which has a very small capacity at one time, and is primarily intended to grind and not mix materials.

The present invention consists of a simple and inexpensive apparatus provided with means for intimately mixing the various grades of sand very much more thoroughly than possible by hand shoveling and very much more cheaply than is possible by means of the present type of apparatus. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of the various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a plan view of my improved apparatus; and Fig. 2 is a transverse central section.

My improved apparatus consists of a carrier in the form of a rotary table 1, upon which the sand to be mixed is charged. This

rotary table is mounted upon suitable supports or bearings in the form of a circular track 2 and is provided with rollers or wheels 3 mounted to operate upon this track. It is driven at a relatively slow speed by means of a central vertical shaft 4, which may be operated from any suitable source of power.

Surrounding the table 1 is a retaining wall or casing 5, having a close fit against the sides of the table. Mounted above the table, and between the central axis of the same and the retaining wall 5 is a sand mixing and distributing element, which I have shown in the form of two shafts 9 and 10, each of which is provided with arms 7 carrying radially arranged blades 8. Each of the two shafts 9 and 10 extend above the level of the walls 5 where they are operated simultaneously, but in opposite directions by means of bevel gears 11, 12, 13 and 14, of which the bevel gears 13 and 14 are carried on a single driving shaft 15. The blades 8 on the shafts are so arranged as to overlap each other, as indicated in Fig. 1, that is, the blades of each element in their rotation will just clear the arms on the other shaft. At their outer sides the blades will just clear the central driving shaft 4 of the table and the retaining wall 5, and thus extend entirely across the path of movement of the sand which is carried by the table.

The table is rotated at a relatively slow speed, and sand may be delivered on to the table through a chute 16 formed in a cover 17, which extends across the entire top of the retaining wall 5, and substantially encloses the table and sand-mixing elements or cylinders. The sand mixing cylinders are operated at a relatively high speed and are designed to cut successive, thin slices of sand from off the advancing edge of the sand pile carried on the table. These two slices of sand are then passed between the centers of the two cylinders at high speed and are thrown forward onto the rotary table, much of the sand striking against the retaining wall 5 when so thrown. As the sand leaves the cylinder blades it would naturally tend to spread over a wide area if it were not for the retaining wall 5, which deflects the sand and causes it to be spread circularly around that portion of the table, which is in advance of the sand-cutting cylinders. The action of the cylinders is to

distribute each slice of sand cut from the advancing pile on the table over this wide area, and in this way an extremely intimate mixture of the various types of sand used can be obtained.

When the sand is mixed it can be discharged from the apparatus through a port 19 formed in the retaining wall 5, and normally closed by means of a hinged portion 20 of the wall. This hinged portion is constructed to swing over the table, but in substantial contact therewith, and thus serves the double purpose of a cover or door for the port in the wall, and also a deflecting plate or guide to direct the sand out through the open port in the side of the casing upon the continued rotation of the table. The table may be emptied of sand in one revolution, by means of this deflecting plate 20, after which the deflecting plate may be closed and more sand charged into the machine for mixing. But very little power is required to operate this apparatus as the table is operated at a relatively slow speed. While the cylinders are operated at high speed very little sand is picked up and thrown forwardly by each individual blade because of the high speed of these blades and the slow speed of the table, that is, very thin slices are cut off from the advancing sand pile on the table by each blade.

The action of my apparatus is to cut a vertical section from the sand pile and then spread this vertical section or slice horizontally over a very much enlarged area on the table. In this way the sand is thoroughly mixed since no two adjacent particles will ever remain in contact under the high speed action of the blades.

Any suitable operating means may be employed for actuating the cutting cylinders and the table. For convenience I employ a single motor 30 driving a shaft 31 through pulleys 32 and 33 and a belt connection 34. The shaft 31 carries a worm 35 engaged with a worm gear 36 on the shaft 4, which rotates the table. The shaft 31 also drives a vertical shaft 37 through bevel gears 38 and 39 and the last-named shaft rotates the shaft 15 through other bevel gears 40 and 41.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as re-

gards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a sand mixing apparatus, the combination of a slow-speed rotary table adapted to receive and move sand thereon, and a pair of bladed cylinders mounted above said table and extending in one radial line from the center to one side thereof, said cylinders extending across substantially the entire path of movement of the sand on said table, and means adapted to rotate said cylinders oppositely at high speed to mix and distribute the sand.

2. In a sand mixing apparatus, the combination of a horizontally disposed rotary table adapted to receive and move sand deposited thereon, a plurality of vertically disposed cylinders mounted above said table upon a radial line from the center to one side thereof and having their lower ends extending into close working association with said table, a plurality of blades comprised in said cylinders, the blades of adjacent cylinders being spaced so as to alternately intersect the respective paths of movement of the opposite blades, and means adapted to rotate said cylinders in directions opposite to each other.

3. In a sand mixing apparatus, the combination of a stationary vertically disposed retaining wall, a horizontally disposed circular rotary table associated with said retaining wall so as to form a mixing chamber with a movable bottom, means for rotating said table, a cover plate engaged over said retaining wall and provided with a hopper and cylinder supporting elements, a plurality of cylinders extending downwardly from said cover plate and having their lower ends in close working association with said table, said cylinders being spaced so as to extend across substantially the entire path of movement of the sand on said table, and means adapted to rotate said cylinders in directions opposite to each other.

Signed by me at Cleveland, Ohio, this 29th day of January, 1920.

HOWARD L. WADSWORTH.