Nov. 26, 1940. A. C. CHRISTENSEN 2,223,018

APPARATUS FOR MIXING MOLDING SAND

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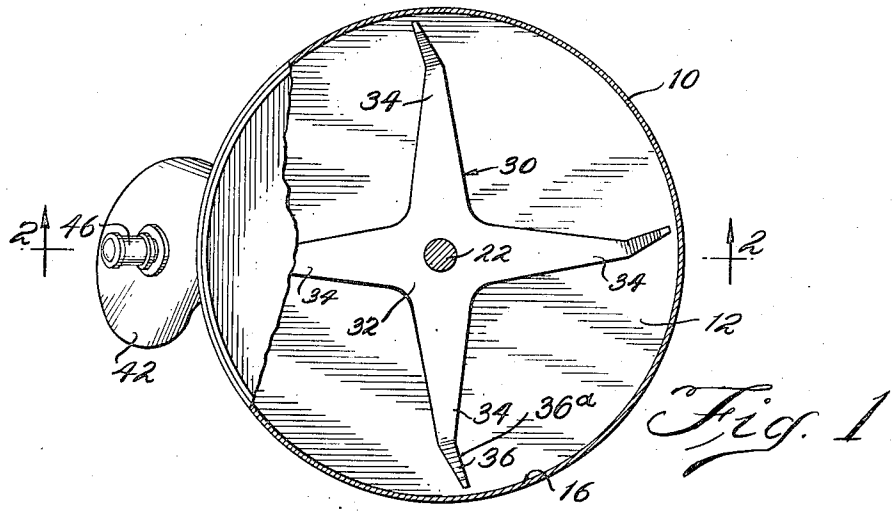


Fig. 1

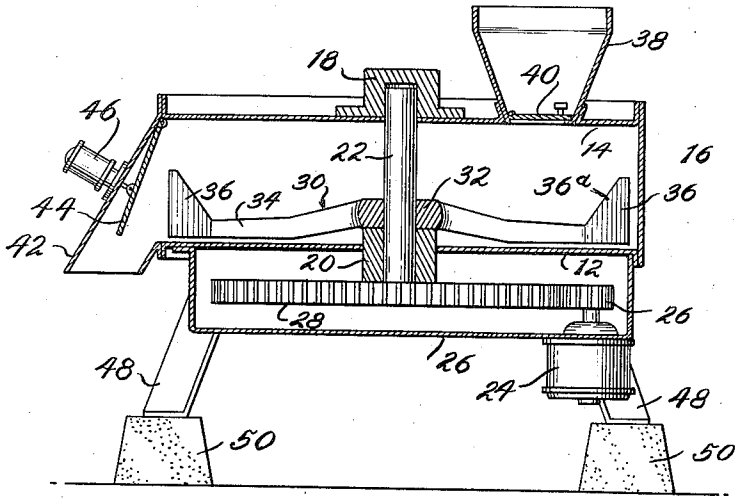


Fig. 2.

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APPARATUS FOR MIXING MOLDING SAND

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6 Claims. (Cl. 259—7)

My invention relates to improvements in mixing apparatus and similar devices. My invention relates more particularly to a new and improved mechanism for mixing pulverant or granular materials and for mixing or blending such materials with liquids or semi-solid substances to form a thoroughly comingled mass.

The principal object of the present invention is to provide an improved means and apparatus for thoroughly comingling materials such as clay, sand and water for molding purposes.

A further object of the invention is to provide an improved mechanism for intermingling the elements above described so that they may be thoroughly and completely intermixed in the minimum amount of time.

A further object of the invention is to provide an apparatus of the type described that is capable of carrying out my new and improved method.

A further object of the present invention is to provide improved mechanism of the type described that is comparatively simple in construction, easy in operation, and that will not easily become broken or out of order.

A further object of the invention is to provide an improved apparatus of the type described which may be horizontally or vertically positioned and operate equally as effectively in either position.

Other objects and advantages will be more apparent from the following description wherein reference is had to the accompanying two sheets of drawings upon which

Fig. 1 is a plan view of my improved mixing mechanism with parts of the top broken away in section to more clearly show parts therebelow;

Fig. 2 is a vertical cross-sectional view taken generally on the lines 2—2 of Fig. 1;

In the mixing of a molding compound, it is well known in foundry practice that one advantageous type of material is a mixture of sand, clay and water. The mixture is preferably obtained by any action which passes the relatively heavier sand through the clay and water in such a manner that each individual grain of sand receives a coating or covering of clay. Sand that has been treated in this manner has been found to be the most desirable for use for certain types of molding.

Accordingly, in the mixer which I have shown, I have provided, as shown in Figs. 1 and 2, a horizontally disposed drum 10 formed with the parallel top and bottom walls 12 and 14 and the vertical cylindrical wall 16. I provide a pair of bearings, 18 and 20, in the upper and lower walls 12 and 14 of the drum to support a vertical axially disposed shaft 22.

Means for driving the shaft 22 may comprise a motor 24 mounted below the gear housing 26 and provided with a pinion 26 within the gear housing. The pinion 26 may mesh with a gear wheel 28 that is keyed to the shaft 22. A suitable switch, (not shown), may be provided for starting and stopping the motor as desired.

The shaft 22 may be in driving connection with a spider 30 formed with a hub portion 32 and a plurality of radially extending blade members 34. Each of the blades 34 may be formed with an angularly disposed end portion 36 that is also extended upwardly with the outer edge parallel to the wall of the drum and the inner edge 36a angularly disposed towards the blade 34.

A hopper 38 may be mounted upon the top wall 14 of the drum and is provided with a door 40 which may be opened or closed as desired, to permit the introduction of the sand, water and clay. An outlet or a discharge chute 42 may be provided in the vertical wall 16 of the drum. I provide an air operated discharge door 44 connected to a cylinder 46 to which a source of air may be connected. In this manner, by the use of the air operated cylinder, the door may be opened or closed as desired.

The drum 10 may be mounted upon a plurality of feet 48 positioned upon suitable blocks 50 of a desired heighth, so that the entire mechanism may be easily and conveniently positioned for operation where desired.

In the operation of my improved mixer, when a quantity of sand, clay and water has been placed in the drum 10 with the inlet door 40 and the outlet door 44 closed, the motor 24 may be started to commence the mixing operation. As the spider 30 is driven by the motor, the mass in the drum will be raised and at the same time be forced forwardly and outwardly against the vertical walls of the drum. As this agitation becomes more rapid, so that the end portion 36 of the blade rotates at the rate of about 2000 feet per minute, the particles of sand particularly will be thrown with greater force through the lighter materials, thus receiving a coating of clay in the process. As the heavier materials are thrown against the walls 16 of the drum, the forwardly inclined extensions 36 of the blades 34, have a tendency to throw them back toward the center

of the drum, and thus there is constant repetition of the coating process.

By the actions thus described, it can be seen that the mixing takes place by the use of the different movements. The sand is thrown outwardly by centrifugal force through the lighter materials. Likewise, the entire mass, and particularly the sand, which is adjacent the cylindrical wall of the drum, is also moved in a forwardly and inwardly direction, whereby the action of centrifugal force repeats the process of throwing the heavier particles outwardly. I have found that by the combination of the actions provided, a very effective mixing of the sand and clay is obtained and an extremely desirable product is produced thereby.

While I have illustrated and described a preferred form of the structure employed, it will be obvious to those skilled in the art that changes and modifications can readily be made in the detailed features shown. What I desire to secure and protect by Letters Patent of the United States is:

1. Apparatus of the class described comprising a stationary closed drum, a vertical axial shaft therein, a spider mounted thereon located in close proximity to the base of said drum, means for rotating said spider, said spider having a plurality of blades having upwardly disposed portions at their extensions, the extensions of said blades being adjacent the walls of said drum and said extensions being angularly disposed forwardly from said spider.

2. Apparatus of the class described comprising a stationary closed drum, a vertical axial shaft therein, a spider mounted thereon located in close proximity to the base of said drum, means for rotating said spider, said spider having a plurality of blades positioned at right angles to each other and having upwardly disposed portions at their outer extensions, the extensions of said blades being adjacent the walls of said drum and said extensions being angularly disposed forwardly from said spider whereby the leading edge of each blade is in advance of the blade.

3. Apparatus of the class described comprising a horizontal closed drum having vertical walls, a vertical axially disposed shaft mounted therein, means for driving said shaft and a spider mounted upon said shaft, said spider being disposed in a horizontal position and situated in close proximity to the base of said drum and having a plurality of radially extending arms, said arms formed with forwardly inclined ends adapted to lie adjacent the vertical walls of said drum, said spider being adapted to hurl ingredients in said drum against the walls thereof at relatively high speed.

4. Apparatus for blending or coating molding sand comprising a circular closed drum, a vertical shaft therein, a spider mounted thereon, means for rotating said spider at relatively high speed, said spider having a plurality of blades positioned at right angles to each other, the extensions of said blades being adjacent the walls of said drum and said extensions being angularly disposed forwardly from said spider whereby the leading edge of each blade is in advance of the blade.

5. Apparatus of the class described comprising a circular closed drum, an axial shaft therein, a spider mounted thereon and located in close proximity to the base of said drum, means for rotating said spider at relatively high speed, said spider having a plurality of blades having angularly disposed portions at their extensions, the extensions of said blades being adjacent the walls of said drum and said extensions being angularly disposed forwardly from said spider.

6. Apparatus of the class described, comprising a closed drum, a vertical axial shaft therein, a spider mounted thereon located in close proximity to the base of said drum, so arranged and constructed that when the spider rotates the materials within said drum are forced against the periphery thereof at high velocity of speed, and the heavier particles of materials are moved through the lighter particles and become coated with the latter.

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