Feb. 19, 1935. K. ADAMS 1,991,833

MIXER

Filed June 2, 1931

Fig. 1.

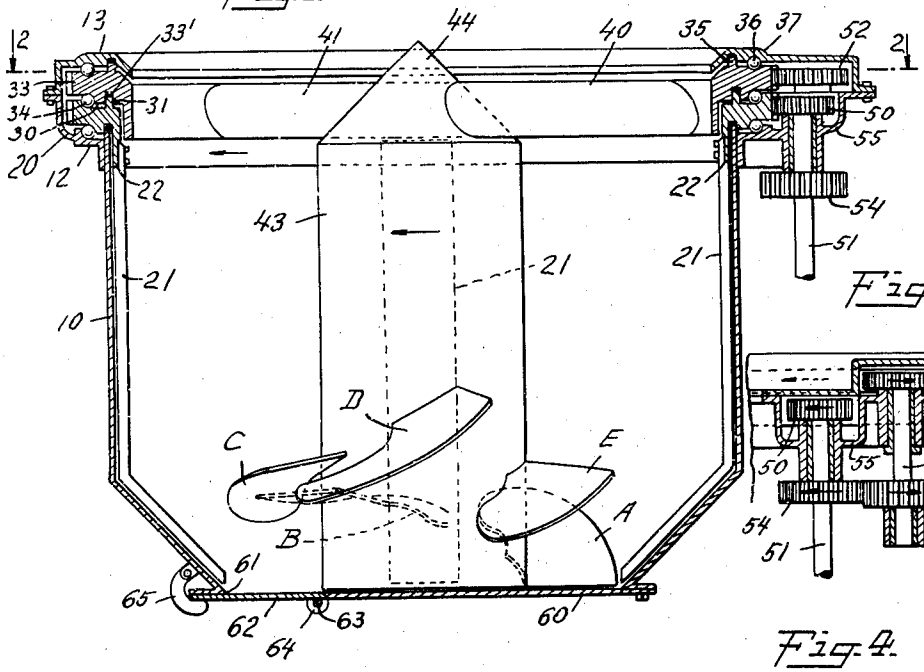


Fig. 3.

Fig. 4.

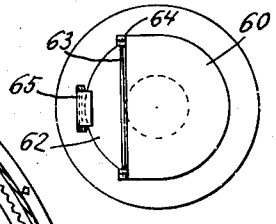


Fig. 2.

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MIXER

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Application June 2, 1931, Serial No. 541,570

1 Claim. (Cl. 83—73)

This invention relates to mixers and particularly to a machine or apparatus for mixing materials, such as the ingredients of concrete.

The modern tendency in concrete practice is to use a stiff mix and mechanical devices or mixers now on the market are not adapted for or suited to the present requirements. Furthermore, difficulty has been experienced in effecting the complete discharge of the material from mixers of the type specified.

This invention has for its salient object to provide a mixer adapted for thoroughly and efficiently stirring and working the ingredients of a stiff or relatively dry mix.

Another object of the invention is to provide a mixer so constructed and arranged that the mixed materials can be quickly, positively and completely discharged from the apparatus.

Further objects of the invention will appear from the following specification taken in connection with the drawing, which forms a part of this application, and in which

The invention briefly described consists of a mixer comprising a receptacle, and a centrally disposed rotatable member therein having a plurality of laterally projecting vanes or blades which extend downwardly and outwardly from the member and have a scooping or spading action on the material. Rotatable means are also provided within and adjacent to the inner surface of the receptacle for scraping the surface and counteracting the tendency of the material to rotate with the central member.

The central member and the other rotatable means are rotated in opposite directions. The blades or vanes in the central member feed the material upwardly and outwardly, but the outer rotating means moves the material away from the inner surface of the receptacle and has a holding or checking action preventing the tendency of the material to rotate with the central member. Obviously, if such rotation is permitted, very little mixing will be effected.

Further details of the invention will appear from the following description.

Fig. 1 is a vertical, sectional elevation of a mixer constructed in accordance with the invention;

Fig. 2 is a top plan view, partly in section, of the structure shown in Fig. 1, the section being taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation of the driving connections; and

Fig. 4 is a bottom plan view illustrating the closure for the bottom of the receptacle and the operating means therefor.

The invention has been particularly developed to overcome a problem experienced with the mixer described and claimed in co-pending application Serial No. 422,281 now matured into Patent No. 1,820,171, granted August 25, 1931.

The mixer shown in said application operated satisfactorily in certain sizes, but in large sizes the mixer would not properly or thoroughly mix the material.

In the particular form of the invention shown in the drawing, there is illustrated a receptacle 10 having mounted thereon at the upper end thereof a ring 12. A second ring 13 is rigidly clamped to the ring 12 in spaced relation thereto.

A skeleton frame comprising an annular ring 20 and a plurality of bars 21 extending downwardly therefrom is mounted with the receptacle. The bars are connected at their upper ends to a flange 22 formed on the ring 20 and a slight clearance is provided between the bars and the inner surface of the receptacle 10.

A ball race 30 is formed on the upper surface of the ring 20 and the ring has a vertically extending flange 31 formed thereon. A ring 33 is mounted on balls 34 positioned between the under surface of the ring 33 and the ball race 30. The ring 33 has an annular recess or groove 33' extending upwardly therein which receives the flange 31 of the ring 20.

A ball race is provided on the upper surface of the ring 33 and an annular upwardly extending flange 35 is formed thereon. Balls 36 are positioned between the upper surface of the ring 33 and a ball race 37 formed in the ring 13.

From the foregoing description it will be seen that the rings 20 and 33 are mounted between the upper and lower rings 13 and 12 which are carried by the receptacle. Furthermore, the rings 20 and 33 are supported for free rotation on ball bearings.

The ring 33 has formed thereon or secured thereto, a plurality of inwardly extending arms 40, 41 and 42 which are connected at their inner ends tangentially to a central post 43. The post 43 has a peaked or pointed upper end 44 for deflecting the material dumped into the receptacle.

The post 43 has secured thereto and arranged in a spiral around the outer surface thereof, a plurality of deflecting vanes A, B, C, D and E. The vane A extends along the bottom of the receptacle at its lower edge and is curved up-

wardly, as shown in Fig. 1, to deflect the material upwardly and turn it over. The vanes B, C, D and E also extend upwardly and are curved to raise and turn over the material.

Particular attention is directed to the shape and arrangement of the vanes B, C, D and E. As shown in the drawing, the advance or forward ends in the direction of rotation of the post 43 are free of or spaced from the post and have a scooping or spading action on the material. Furthermore, there is a slight downward slope of the outer edge of each blade which acts to free the material from the blades when dumping the charge.

Driving connections are provided for rotating the central post and deflecting vanes or wings in one direction and for rotating the ring 20 and bars 21 in the opposite direction. Each of the rings 20 and 33 has gear teeth formed at the outer periphery thereof. The ring 20 is rotated by a gear 50 mounted on a shaft 51 which receives power from any suitable source. The ring 33 is driven by a gear 52 which is mounted on a shaft 52′ on which is also mounted a gear 53 which meshes with a gear 54 carried by the shaft 51. It will be obvious that the gears 50 and 52 will rotate in opposite directions and, therefore, that the rings 20 and 33 will be rotated in opposite directions. The driving gears are enclosed within a casing 55 which is formed in extensions of the rings 12 and 13.

The bottom of the receptacle is partially closed by a stationary segment 60 and has an opening 61 closed by a hinged segment 62. The segment 62 is mounted on a shaft 63 mounted in lugs 64 and attention is directed to the fact that the pivoted mounting for the segment 61 is out of the path of the material discharged from the mixer. A latch 65 is provided to hold the segment closed.

The mixer above described operates in the following manner: When a charge of material has been dumped into the mixer, the shaft 52′ will be rotated, thus causing the rings 20 and 33 to rotate in opposite directions. As these rings are rotated, the central post 43 and vanes carried thereby will be rotated in one direction to mix, stir, raise and turn over the material in the receptacle, and the bars 21 will rotate in the opposite direction coacting with the centrally disposed mixing means to thoroughly intermix the material.

It has been found that the centrally disposed stirring and mixing means does not operate satisfactorily without the coaction of the bars 21 since the material disposed centrally in the receptacle is localized in a mass and rotates around with the central post and the blades carried thereby. Substantially no mixing is effected in this way. However, the rotation of the bars 21 in the opposite direction tends to resist and offers sufficient resistance to the localized action described to cause the mass of material in the receptacle to be thoroughly stirred and intermixed. The arms 21 furthermore prevent the material from sticking or adhering to the inner surface of the receptacle.

The blades or vanes B, C, D and E scoop into the material and raise and feed it outwardly, coacting with the arms 21 to mix the material.

After the material in the receptacle has been thoroughly mixed, the direction of rotation of the rings 20 and 33 can be reversed and when the closure in the bottom of the receptacle has been opened, the material will be ejected through the bottom by the action of the vanes or wings A, B, C, D and E.

Although one specific embodiment of the invention has been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claim.

What I claim is:

A mixer comprising a receptacle, rotatable means within said receptacle for deflecting the material upwardly and outwardly, said means comprising a centrally disposed supporting member and blades carried thereby and extending downwardly and laterally therefrom whereby the blades at their advance ends extend into the material, said blades having a downward slope away from the supporting member at their upper ends, means within and adjacent the inner surface of the receptacle for coacting with the centrally disposed means to mix the material, and means for rotating said centrally disposed means and outer means in opposite directions.

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