

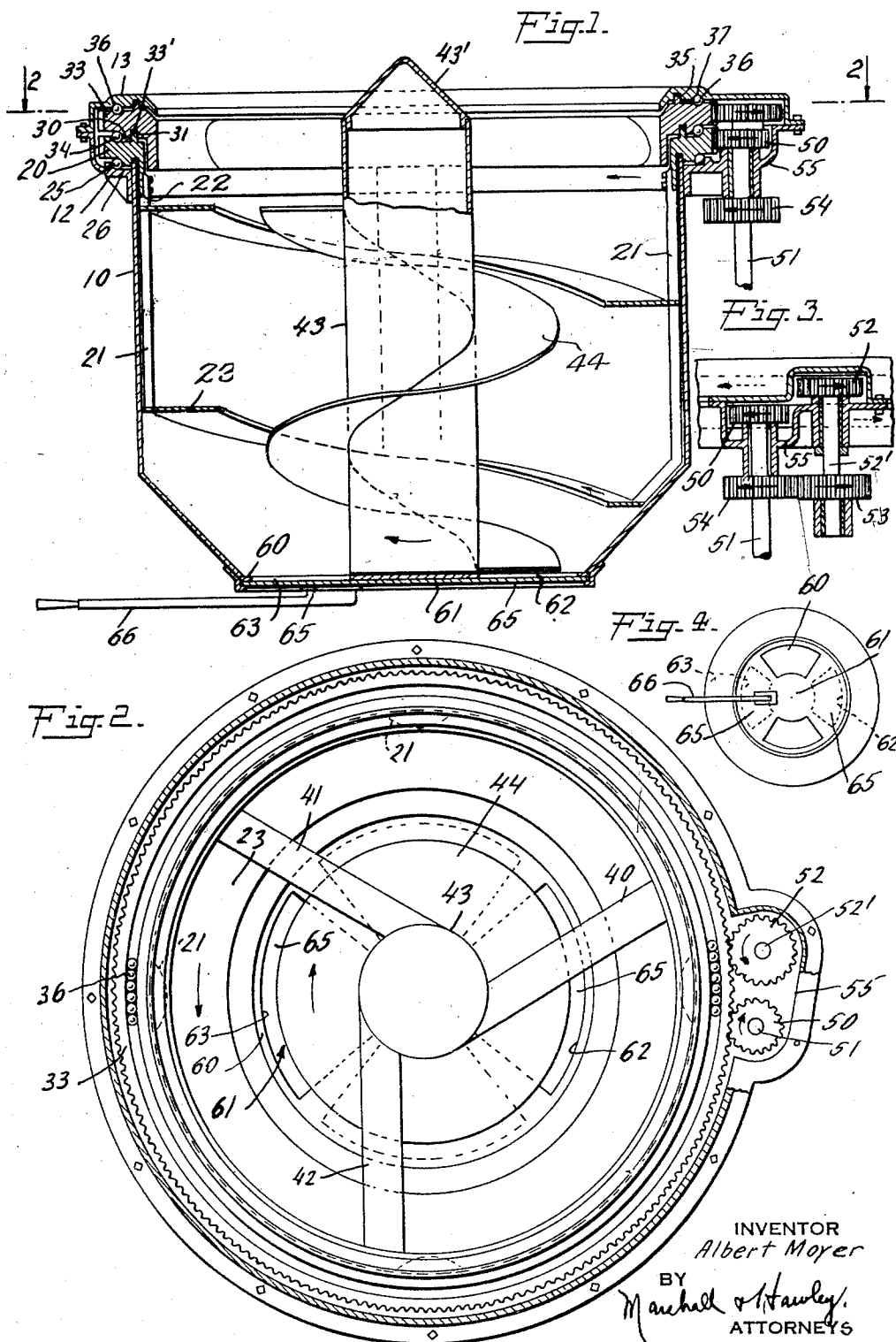
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MIXER

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MIXER

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

5 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
10 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.

15 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 drawings, which form
20 a part of this application, and in which

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

30 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

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

The invention briefly described consists of a mixer comprising a receptacle, a centrally disposed member in the receptacle having deflecting means adapted to lift and turn over the material, and a frame within the receptacle having means adapted to scrape the material from the wall of the
40 receptacle and to feed the material downwardly and coact with the centrally disposed deflecting and stirring means to thoroughly mix the material. The central member has a continuous spiral web or deflecting means
50 adapted to raise and turn over the material

and the outer frame has a continuous spiral rotatable in a direction opposite to the central spiral to oppose the rotation of the mass of material by the central spiral and to feed the material downwardly. The receptacle within which the mixing devices
55 are enclosed, is preferably stationary, and means is provided for rotating the outer frame in one direction and for rotating the member disposed centrally in the receptacle
60 in the opposite direction. Furthermore, the driving means is so arranged that the directions of rotation of the parts can be reversed so as to feed the material downwardly during the emptying or dumping of
65 the material from the receptacle.

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

In the particular form of the invention shown in the drawings, there is illustrated
70 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
75 ring 20 and a plurality of bars 21 extending downwardly therefrom is mounted within the receptacle. The bars are connected at their upper ends to a flange 22 formed on the ring 20. The ring 20 is mounted on
80 rollers 25 positioned between the under surface of the ring 20 and a ball race 26 formed on the upper surface of ring 12.

Attention is also called to the fact that a slight clearance is provided between the
85 bars and the inner surface of the receptacle 10. A continuous spiral web 23 is carried by the bars 21 and extends inwardly therefrom as shown in Fig. 1. The bars scrape
90 the material from the inner surface of the receptacle and the spiral web feeds the material downwardly.

A ball race 30 is formed on the upper surface of the ring 20 and the ring has a
95 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' extend-
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ing 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 43' 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 continuous spiral web 44 which projects laterally from the post.

Driving connections are provided for rotating the central post and spiral 44 in one direction and for rotating the ring 20, bars 21 and spiral 23 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 provided with a closure comprising a stationary member 60 and a rotatable member 61. The stationary member 60 has a pair of openings 62 and 63 and the rotatable member 61 has shutters or closures 65 adapted to register with the openings and to close the openings in one position of rotation of the member 61. A handle 66 is secured to the member 61 for moving the member into closing or opening position.

The mixer above described operates in the following manner: When a charge of material has been dumped into the mixer, the shaft 51 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 spiral web 44 carried thereby will be rotated in one direction to mix, stir, raise and turn over the material in the receptacle, and the bars 21 and spiral

web 23 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 rotating outer frame since the material disposed centrally in the receptacle is localized in a mass and rotates around with the central post and the spiral web carried thereby. Substantially no mixing is effected in this way. However, the rotation of the bars 21 and spiral web 23 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 or bars 21 furthermore prevent the material from sticking or adhering to the inner surface of the receptacle. 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 spiral web 44.

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 claims.

What I claim is:

1. A mixer comprising a receptacle, a frame within said receptacle, rotatable relative thereto, a spiral web carried by said frame, a central supporting member in said receptacle, a spiral web carried thereby and extending in the same direction as said first named spiral web, and means for rotating said frame and said supporting member in opposite directions.

2. A mixer comprising a receptacle, a frame within said receptacle including downwardly extending bars, said frame being rotatable relative to said receptacle, a spiral web carried by said frame, a central supporting member in said receptacle, a spiral web carried thereby and extending in the same direction as said first named spiral web, and means for rotating said frame and said supporting member in opposite directions.

3. A mixer comprising a receptacle, a frame within said receptacle, rotatable relative thereto, a continuous spiral web carried by said frame, a central supporting member in said receptacle, a spiral web carried thereby and extending in the same direction as said first named spiral web, and means

for rotating said frame and said supporting member in opposite directions.

4. A mixer comprising a receptacle, a frame within said receptacle, rotatable relative thereto, a continuous spiral web carried by said frame, a central supporting member in said receptacle, a spiral web carried thereby and extending in the same direction as said first named spiral web, and means for rotating said frame and said supporting member in opposite directions.

5. A mixer comprising a receptacle, a frame within said receptacle, rotatable relative thereto, a continuous spiral web carried by said frame, a central supporting member in said receptacle, a spiral web carried thereby, means for rotating said central web in a direction to feed the material upwardly and outwardly, and means for rotating said frame in a direction to feed the material inwardly and downwardly.

6. A mixer comprising a receptacle, a pair of spiral webs in said receptacle, one web being centrally disposed therein and the other web being disposed adjacent the inner surface of the receptacle, means for rotating the centrally disposed web in a direction to raise and feed the material outwardly, and means for rotating the other web in a direction to feed the material inwardly and downwardly.

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