



# UNITED STATES PATENT OFFICE

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## MIXER

Application filed November 22, 1930. Serial No. 497,565.

This invention relates to a machine for mixing cement, lime or other material. An important object of the invention is to hydraulically mix materials with a fluid (water) and then thoroughly change and improve the constituency by mechanical agitation.

Another object of the invention is the construction of a mixer which may utilize the force of gravity. Still another object is to construct a machine which will not only serve as a mixer, but one wherein the mixed product has been elevated to be readily portable.

Another advantage of this mixer over others aiming to attain similar results is that the proportions of both the solids and liquids may be regulated within the mixer.

Additional objects and advantages of my invention will be apparent during the course of the following description and claims.

In the accompanying drawing forming a part of this specification in which the same reference numeral is used to designate the same part throughout the several views,

Figure 1 is a vertical transverse section through the mixing machine; and, Fig. 2 is a horizontal section taken on line 2—2 of Fig. 1, looking in the direction of the arrows.

In the sheet of drawing, wherein for the purpose of illustration, is shown a preferred embodiment of my invention, the numeral 3 designates a base which supports a hopper 4 having a reduced mouth or outlet 5. In the hopper 4 is a grid 6, preferably horizontal. In conjunction with grid 6 is a reciprocating grate 7 adapted to be moved or actuated by handle 8, and means by which the feed of solids may be regulated.

Below the grid 6 is an annular pipe or tube 9 having a plurality of apertures 10; the pipe 9 being connected with a water inlet-pipe 11, which is controlled by valve 12.

Above the outlet 5 is a cuneiform baffle 13 supported by straps 14 which are attached to the inside of the hopper, so as to deflect solids against the sides of the cone, thus preventing it from falling into the mixing chamber before coming into contact with the fluid.

Outlet 5 connects with a tubular mixing chamber 15 which is in an upwardly inclined position, the longitudinal axis of which forms

an acute angle with the surface of the ground or floor. The lower end of the tubular mixing chamber 15 is closed at 16, but the upper or outlet end is open as at 17.

Concentrically within the mixing and conveying chamber 15 is a screw or spiral conveyor 18, the lower end of which is mounted in a combined thrust bearing and packing gland 19.

The upper end of the screw 18 is journaled at 20 and the screw is turned by any operable means, such as a pulley or gear 21. The mixed substance leaves chamber 15 by being ejected into a portable receptacle 22 whereupon it may be used as required.

A coupling 23 is provided between the larger diameter chamber 15 and its reduced outlet end. This renders the parts more accessible and facilitates removal of the screw 18.

In operation: material is dumped into hopper 4. As the material passes through grid 6 it falls against the side of the lower conical part of hopper 4, where it comes into intimate contact with the fluid, or against the baffle 13 which deflects solids against the side of the cone.

The fluid passes through pipe 9 from whence it is introduced into the lower part of the hopper 4 in a diagonal manner so that a revolving sheet of water covers the lower inside section of the cone. Into this sheet of water the solids are introduced and thence the mixture enters the tubular mixing and conveying chamber 15. The agitation therein caused by the turning screw or spiral conveyor 18 and the action by gravity on the substance being elevated gives a thorough resultant mixture.

The consistency of the mix is governed or controlled by my novel regulation, viz: the grid 6 and the grate 7, actuated by handle 8, in conjunction with the supply of fluid controlled through valve 12.

The machine is particularly well adapted for use in mixing cement, but not necessarily restricted to this precise use, as it may be employed to mix mortar or various materials.

It is understood that the form of my invention herein shown and described is to be

taken as a preferred embodiment of the same, and that various changes in the shape, size, and arrangement of parts, may be resorted to, without departing from the spirit of my invention or the scope of the subjoined claims.

5 Having thus described my invention, I claim:

1. A mixer comprising a hopper having a conical lower portion terminating in an outlet at its bottom, sifting means adjacent the top of the conical portion of said hopper, a water inlet pipe, an annular delivery head for said pipe in the hopper below the sifting means and having discharge openings for delivering water upon walls of the conical portion diagonally thereof and forming a sheet of whirling water, a cylindrical mixing chamber below said hopper communicating with the outlet and extending at an upward incline, a tubular conveyor housing extending upwardly from said chamber in alignment therewith and a screw conveyor extending through the mixing chamber and housing with its spiral blade against walls thereof, said housing being detachable from the mixing chamber whereby said conveyor may be removed.

2. A mixer comprising a hopper having a conical portion terminating in an outlet at its bottom, a sifter adjacent the top of the conical portion, a water inlet pipe, an annular delivery head for said pipe below the sifter and having discharge openings for delivering water upon walls of the conical portion diagonally thereof and forming a whirling sheet of water, a mixing chamber below the hopper communicating with the outlet thereof, and means in said chamber for thoroughly mixing material and water in said chamber and discharging the mixture from the same.

3. A mixer comprising a hopper having a conical portion terminating in an outlet at its bottom, a sifter adjacent the top of the conical portion, a water inlet pipe, an annular delivery head for said pipe below the sifter and having discharge openings for delivering water upon walls of the conical portion diagonally thereof and forming a whirling sheet of water, a conical baffle in said hopper above its outlet for directing material towards walls of the hopper, said baffle being supported above the outlet out of closing relation thereto whereby material may be washed through the outlet by the whirling sheet of water, a mixing chamber communicating with the outlet, and means for mixing material and water in said chamber and discharging the mixture.

4. A mixer comprising a hopper having a conical portion terminating in an outlet at its bottom, means for directing water against the walls of the conical portion and form a whirling sheet of water thereon, means for sifting material passing into the conical por-

tion of the hopper, a mixing chamber below the hopper communicating with the outlet and extending upwardly towards its discharge end, a conveyor housing of less diameter than said chamber aligned therewith and having an enlarged end portion detachably secured to the discharge end of the chamber, and a screw conveyor having a shaft extending axially through the chamber and having a spiral blade having edge portions bearing against walls of the housing and chamber.

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