Aug. 13, 1929. S. SNYDER 1,724,808

MIXING MACHINE

Filed Feb. 26, 1929

Fig. 1.

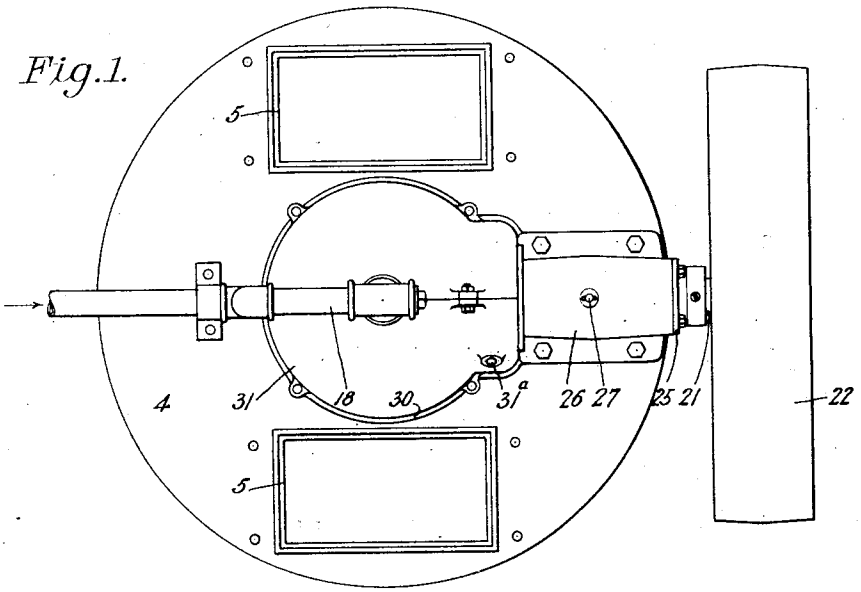
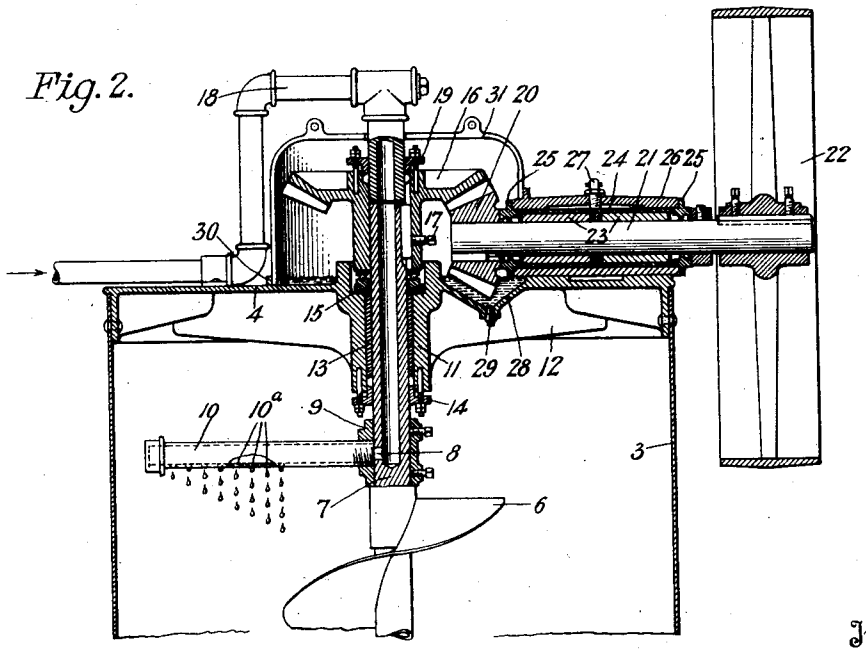


Fig. 2.



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UNITED STATES PATENT OFFICE.

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MIXING MACHINE.

Application filed February 26, 1929. Serial No. 342,740.

This invention relates to mixing machines and aims to provide a pulverulent or granular material mixer of improved construction embodying novel means for introducing a liquid thereinto during mixing operation, and means for maintaining drive-transmitting parts in lubrication.

The invention will be best understood by further description with reference to the accompanying drawings wherein one form or constructional embodiment thereof is illustrated.

In said drawings:

Fig. 1 is a plan view of the improved mixer showing the drive transmission housing and liquid feed pipe; and

Fig. 2 is a vertical sectional view of the upper part of the mixer, the lower part being broken away.

The illustrative mixer is of well known vertical type embodying an elongate cylindrical receiver or chamber 3 having a lower end (not shown) of frusto-conical form providing a constricted discharge passage controlled by a valve as shown for example in the U. S. Patent to Bullock No. 1,496,807.

The upper end of said receiver is closed by a removably secured top 4 having openings 5 therein over which the ends of conveyor chutes (not shown) may be secured for introducing stock feed, grain or other material into the mixer from different bins.

Disposed axially of the mixing chamber is shown a continuously rotated spiral flight or agitator 6 adapted to pick up and carry the feeds or materials therein from its lower to its upper end and to throw the same off into the annular space between said flight and the wall of the mixer so as to create and maintain concentric opposite currents of circulation and thereby cause a thorough intermixture of the different materials.

Said flight or mixing element may comprise a single casting provided with journal ends, but in this instance is formed as a tubular member fixed on a rotatably driven shaft 7 which is supported in bearings at the bottom and top of the mixing chamber. In the vertical arrangement of the chamber, the upper end of said shaft (or of the mixing element) is axially bored or otherwise made in tubular form and projects outward from the chamber through the top. At the inner limit or base of its tubular portion, a lateral or radial orifice 8 is provided.

Clamped on the shaft at this point is shown a collar-member 9 carrying a nozzle element 10 in registration with its aforesaid orifice. This nozzle is shown as a short pipe section having a longitudinally disposed series of small drain orifices 10^a and a cap closing its outer end. If desired, said collar-member may be arranged to carry a plurality of these or other nozzles in registration with a plurality of orifices in the shaft.

As the lower end of the mixing chamber is omitted in the drawings, the support bearing for the lower end of the aforesaid shaft is not visible. The bearing for the upper end thereof is shown provided by a sleeve-portion 11 of the receptacle top, which latter is accordingly formed with reinforcing ribs 12. This bearing sleeve is lined with the usual bushing 13 and carries a clamp-ring 14 with packing at its lower end. It upper end is shown enlarged and recessed to receive roller race-bearings 15 and extends above the level of the receptacle top for a purpose to be later explained.

On the outward projecting end of the aforementioned shaft is secured a driving gear 16 having a hub-portion resting on the roller race-bearings within the upper end of the aforesaid bearing sleeve. In this instance said gear is wedge-keyed to the shaft and held by a set-screw 17 to prevent undue play.

Shown extending into the hub-portion of said gear is the delivery end or connecting section of a liquid feed pipe 18 in open communication with the tubular end of the aforementioned rotatably driven shaft, by which liquid from a source of supply may be introduced into the mixing chamber through said shaft for intermixture with the dry materials. As the liquid feed line is fixed while the shaft into which it delivers is rotatable, its delivery end or pipe section in this arrangement is provided with a surrounding packing and clamp-ring 19 serving also to steady it within the gear hub.

Meshing with the aforesaid gear is a pinion 20 keyed on one end of a shaft 21 carrying a belt pulley 22 through which it is driven by power means (not shown). This shaft is journaled on the receptacle top in a special bearing embodying sleeve-bushings 23 between spacers within a liner 24 held by end-plates 25 and enclosed within a separable bearing casing 26. A lubricant nipple 27 is provided in the latter for forcing grease under pressure into the bearing.

The portion of the receptacle top underlying the aforesaid pinion is concaved to form an oil reservoir 28 in which the pinion may rotate to keep it and the aforementioned gear well lubricated. A drain hole closed by a plug 29 is advantageously provided for this reservoir. The receptacle top is also formed with a flange 30 annularly surrounding its central sleeve-member and bordering the reservoir therein, so as to provide an enclosure within which are fitted separable halves of a casing 31 completely housing the drive transmission gearing pinion. An oil hole 31ª is provided in this casing for feeding oil to the reservoir. This housing in conjunction with the upwardly extending sleeve-portion of the receptacle top provides additional space permitting the liquid in the reservoir to be raised to a higher level.

It will be appreciated that a mixing machine of improved construction is thus provided. The feature of introducing a liquid into the mixing chamber through the rotary mixer element or agitator for intermixture with dry pulverulent materials under mixing operations is novel, simple and a decided improvement over the means heretofore known and used for that purpose. Moreover, the provision of a lubricant bath for the drive transmission parts has decided advantages adding to the improvement. These features combined with the special form of bearing for keeping the driving shaft lubricated with grease under pressure contribute to a highly improved construction.

As different constructional embodiments with various changes in the form and arrangement of parts may be made without departing from the spirit and scope of the invention, it is not intended that the appended claims shall restrict the invention to the specific construction shown and described.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In combination with the mixing chamber and rotatably driven agitator carrying shaft of a feed mixing machine, a discharge nozzle projecting laterally from said shaft wholly above the agitator for introductively discharging a liquid downwardly into the chamber at points above said agitator.

2. In a feed mixer machine including a closed mixing chamber and a rotatably driven shaft carrying a rotating mixer element, means including a nozzle projecting laterally from said shaft wholly above the agitator for distributively discharging molasses downwardly into said chamber at points above the mixer element and between said element and the chamber walls.

3. In a feed mixer machine embodying a mixing chamber and a rotatably driven shaft carrying an agitator within the chamber, means including a nozzle projecting laterally from said shaft for distributively discharging molasses downwardly into said chamber at points above the agitator and between said agitator and the chamber walls.

4. In a feed mixing machine including a closed mixing chamber and a rotatable shaft having an agitator thereon supported within the chamber; means including an open-ended connection of said shaft with a molasses supply pipe outside the chamber and a nozzle projecting laterally from said shaft within the chamber for discharging molasses therethrough downwardly into the mixing chamber at distributive points wholly above said agitator.

5. A feed mixing device comprising in combination, a closed mixing chamber, a shaft journaled to rotate within said chamber and having one end of tubular form projecting outwardly therefrom, an agitator carried by the shaft, means for rotating the same, a liquid supply pipe having its delivery end fixed in open communication with the tubular end of said rotatable shaft, and nozzle means projecting laterally from said shaft for distributively discharging the liquid from the tubular portion thereof downwardly into the chamber at points wholly above the agitator.

6. A mixing device comprising in combination, a closed mixing chamber, a shaft journaled to rotate within said chamber and having one end of tubular form projecting outwardly therefrom, an agitator rotatably carried by said shaft, means for rotating the shaft, a liquid feed pipe having its delivery end in open communication with the tubular end of said shaft, and a nozzle projecting radially from the tubular portion of said shaft within the chamber for distributively discharging the feeding liquid downwardly into the chamber at points wholly above the agitator.

In testimony whereof I affix my signature.

SIMON SNYDER.