June 20, 1933. F. J. REIDER ET AL 1,914,459

FEED MIXER

Filed April 27, 1931

Fig. 1.

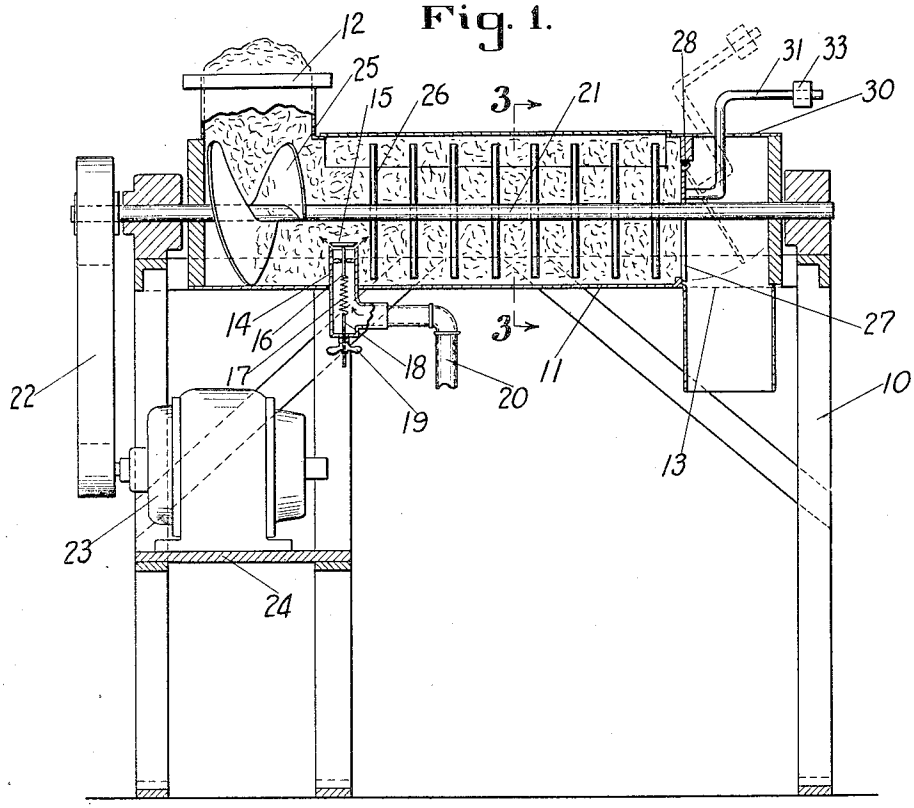


Fig. 2.

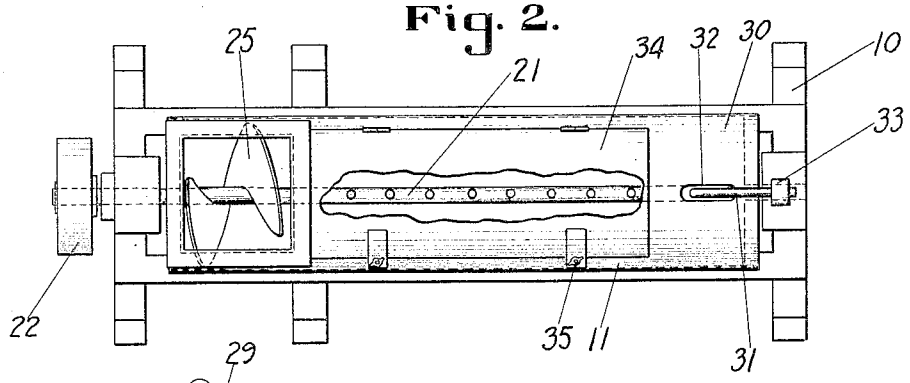
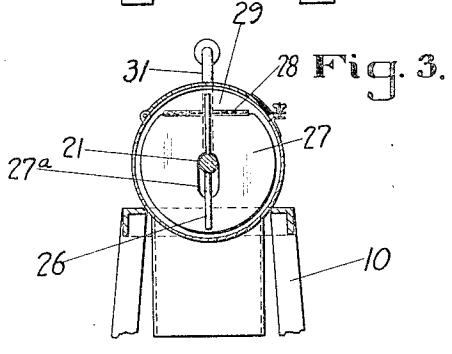


Fig. 3.



Inventors

Frank J. Reider

Ora J. Raetzel

By Owen & Owen

Attorneys

Patented June 20, 1933 1,914,459

UNITED STATES PATENT OFFICE

FRANK JOY REIDER AND ORA JAY KAETZEL, OF BOWLING GREEN, OHIO

FEED MIXER

Application filed April 27, 1931. Serial No. 533,015.

This invention relates to an apparatus for mixing feed, and particularly to stock feed mixers in which a grain content is mixed with a liquid content. The liquid content, which it is here contemplated, shall be mixed with the grain, is molasses.

It is a desideratum to provide a simple and efficient apparatus for mixing grain and cold molasses in such manner that the finished product is uniform, flaky and free from lumps, and which is so constructed that a minimum amount of power is necessary for operation. Heretofore, machines of this character have not been entirely satisfactory, because the power requirement was too great; the finished product was lumpy showing that thorough commingling of the grain and molasses was not obtained; or the machine was too costly for the average user.

An object of this invention is to overcome the above difficulties and provide a feed mixer adapted to obtain a finished product which is substantially free from lumps.

Another object is to produce a simple and efficient apparatus for mixing materials, such as grain and molasses in which the friction developed between the materials and the walls of the mixing chamber can be controlled so that thorough mixing of the ingredients may be obtained without utilizing unnecessary power.

A further object is to produce a mixing apparatus in which solid and liquid materials, such as grain and cold molasses, may be thoroughly mixed and mechanically discharged, and in which means is provided responsive to the material in the mixing chamber for retarding the discharge of the finished product, thereby regulating the friction developed within the mixing chamber and insuring a thorough mixture of the solid with the liquid.

A still further object is to produce a feed mixer having the new and improved features of construction, arrangement and operation hereinafter described, and for purposes of illustration, but not of limitation, an embodiment of the invention is shown on the accompanying drawing, in which:—

Figure 1 is a longitudinal sectional elevation of a feed mixing apparatus;

Figure 2 is a top plan view of the apparatus shown in Figure 1 with a portion thereof broken away to show the agitator rods; and

Figure 3 is a transverse sectional view on the line 3—3 of Fig. 1 showing the retarding gate.

The illustrated embodiment of the invention comprises a feed mixer having a standard 10, on which is mounted a horizontally disposed closed receptacle 11 provided at one end with an inlet 12 for feed, and at the opposite end with an outlet 13 for the finished product, the latter extending downwardly to enable the feed to fall from the container by gravity. Access to the inside of the receptacle may be had through a hingedly mounted door 34 normally held in place by thumb screws 35. Extending into the receptacle through the lower wall is a molasses inlet nozzle 14, which is controlled by a poppet valve 15 having a depending stem 16, which is connected by a coil spring 17 to a screw threaded stem 18, the latter extending outside of the nozzle and onto which is screwed a wing nut 19 providing manual adjustment for the spring 17. Leading from the nozzle 14 is a pipe line 20 which may lead from any suitable source of cold molasses under a pressure of from 20 to 30 pounds to obtain the desired flow.

The poppet valve 15 enables the molasses to be discharged into the interior of the receptacle 11 in a thin sheet, which facilitates the mixing of the cold molasses with the grain or feed introduced into the receptacle through the inlet 12. It will be understood that should the pressure in the line 20 be reduced or the supply shut off the valve 15 automatically closes and prevents dribbling of the molasses into the receptacle so that the interior of the receptacle can be thoroughly cleaned without liability of additional molasses flowing in. The valve 15 also prevents clogging of the nozzle, thereby insuring a uniform flow of the liquid into the receptacle at all times. It will also be apparent that, owing to this construction, the nozzle may be located either on the top, bottom or side walls

of the receptacle, whichever is most convenient.

Extending longitudinally through the center of the receptacle 11, and having bearing at opposite ends in the standard 10, is a shaft 21 which has a belt and pulley connection 22 with an electric motor 23 mounted on a platform 24, which is secured to the standard 10. Secured to the shaft 21 in the region of the feed inlet 12 is a relatively short screw 25, which is shaped to impart movement of the feed longitudinally of the receptacle 11 toward the outlet 13. The screw 25 operates immediately upon the feed introduced into the receptacle, and forces it progressively through the chamber where it is thoroughly mixed with the cold molasses or other liquid by a series of radially disposed rods or fingers 26, which extend radially of the shaft 21. Preferably, the rods project at substantially right angles to the axis of the shaft 21 and extend in diametrically opposed relation on opposite sides of the shaft 21.

An outstanding feature of this invention resides in the provision of a gate 27, which is pivoted at its upper end at 8 to a flange 29 depending from an extension 30 of the receptacle 11. The gate 27 is mounted to swing outwardly or in the direction of movement of the feed passing through the mixing chamber. Secured to the outer side of the gate 27 is a substantially S-shaped arm 31, which extends through an elongate slot 32 formed in the wall of the receptacle extension 30. Attached to the horizontally disposed portion of the arm 31 outside of the extension 30 is a weight 33, which may be moved along the arm 31 to regulate the amount of pressure desired to retain the gate in closed position.

A certain amount of friction is required in mixing solids with liquids, such as grain and cold molasses, but the amount of friction necessary for thorough mixture of the ingredients depends on the viscosity of the liquids, the coarseness of the solid, as well as the percentage of the liquid used. The gate 27 is of considerable advantage in that it enables the friction within the mixing chamber to be regulated as desired since adjustment of the weight 33 along the arm 31 increases or diminishes the resistance to the flow of material in the mixing chamber. Consequently, only the necessary amount of friction to make a thoroughly commingled finished product is created, so that regardless of variations in the proportions desired, or the granulation of the particles to be mixed, a smooth and lumpless finished product can be obtained.

It is particularly to be noted that the gate 27 cooperates with the screw 25 to maintain the mixing chamber completely filled with the ingredients, thereby enhancing the operation of the agitating fingers 26 and enabling the desired mixture to be obtained with a minimum of power.

The retarding gate 27 enables the discharge opening to be placed where it should naturally be, at the base of the cylinder, and this eliminates the liability of the mixture lodging in and clogging the throat of the tangential or side discharge arrangements which have heretofore been employed. The gate may be manually opened by lifting the arm 31, and thereafter the mixing chamber will almost entirely empty itself of the mixture contained therein so that the necessity of flushing the receptacle between batches is practically eliminated. A slot 27ª is formed in the lower portion of the gate 27 so that when the gate swings upwardly it will clear the shaft 21.

While we have described our improved machine in more or less detail to comply with the requirements of the statute, it is, nevertheless, desired that this detailed description be considered merely as illustrative, and not as limiting, and it is to be understood that changes and modifications may be made by those skilled in this art without departing from the invention, as defined in the following claim.

What we claim is:

In a feed mixing apparatus, a closed receptacle having feed and liquid inlets adjacent one end and an outlet for the finished product adjacent the opposite end, a rotatable shaft mounted in said receptacle, a feed advancing member on said shaft beneath the feed inlet, mixing arms on the shaft between said advancing member and the outlet, the mixing arm next adjacent said advancing member being spaced therefrom, and said liquid inlet extending into said casing between the advancing member and said next adjacent arm and terminating adjacent said shaft, a pivotally mounted feed retarding gate for said outlet disposed transversely across the axis of said shaft, an arm connected to said gate, and an adjustable member on said arm whereby to regulate and retard the movement of the mixture past the mixing arms and through the outlet.

In testimony whereof we have hereunto signed our names to this specification.

FRANK JOY REIDER.
ORA JAY KAETZEL.