

Dec. 16, 1952

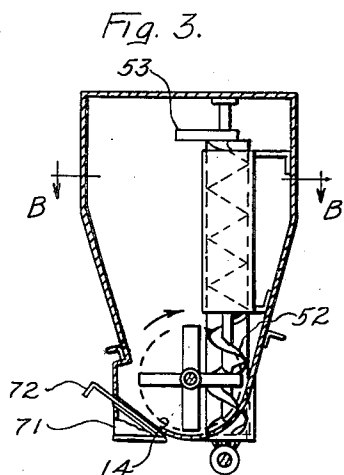
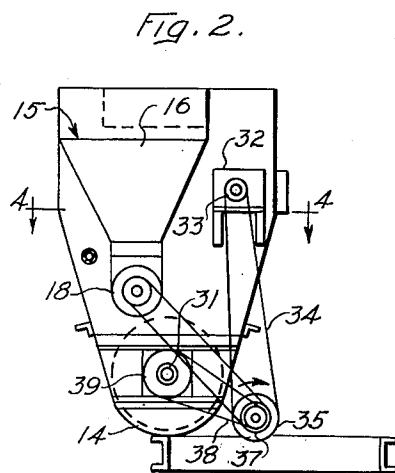
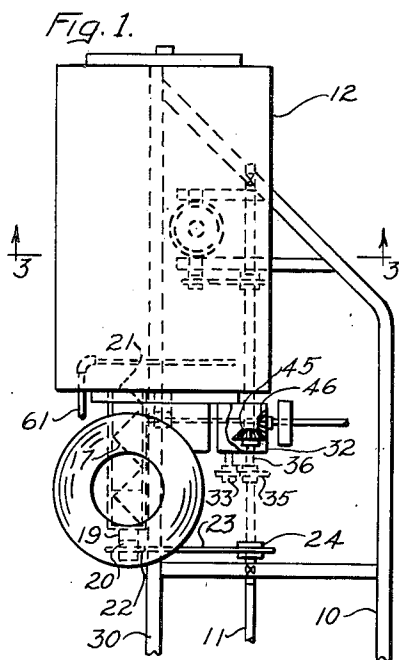
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2,621,904

MOLASSES MIXING TANK

Filed June 9, 1950

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

Fig. 4.

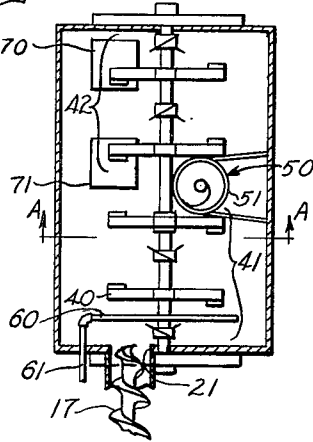


Fig. 6.

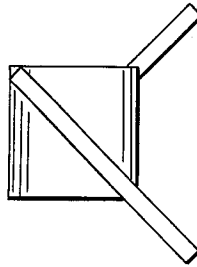


Fig. 7.

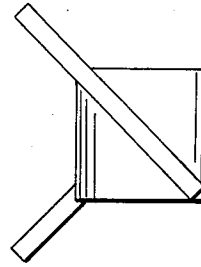
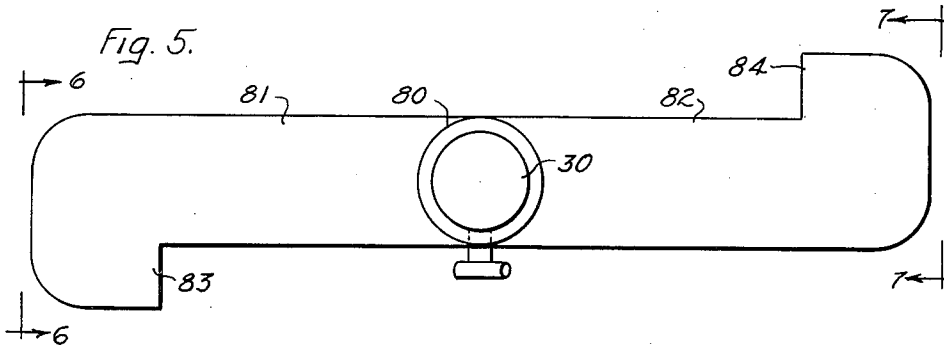


Fig. 5.



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MOLASSES MIXING TANK

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3 Claims. (Cl. 259-9)

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This invention relates to feed mixers and more particularly to an automatic apparatus for mixing molasses or other nutrient liquids into grain or stock feeds.

This mixer in its preferred form will be added as a unit to the portable automotive mill that is so commonly used by the farmer today. Thus with slight modifications to the present form of automotive mill the ground feed coming out of the mill may be emptied into a collector and the collector will in turn force the ground feed into the mixing tank. The mixer is so constructed that the drive mechanism for the mill may be connected by means of the necessary shafts and drive chains and sprockets to drive the mixer. A molasses tank is connected to the mixer and by means of a perforated inlet pipe and a valve the molasses or nutrient liquid may be introduced into the mixing tank and sprayed on the initial charge of the ground feed as it enters the mixer. The mixer is so designed that the ground feed charged therein will be thoroughly mixed by the action of a plurality of radial rotor blades having a conveyor pitch. The blades are divided into two groups although mounted on a single central shaft. One group tends to force the feed from the charging end toward the center of the mixer while the other group tends to force the feed from the opposite end of the mixed toward the center. In addition a vertical enclosed conveyor is positioned at the center of the mixing tank carrying the feed to the top of the tank where it is dumped upon a pair of finger blades where the feed will be in turn forced outward toward either end of the mixing tank. Thus the feed will fall upon either end of the radial rotor mixing blades and continue to be mixed in the same cycle as described.

It is an object of this invention to provide a feed mixer with a single rotor provided with two sets of radial blades, each set having an opposite conveyor pitch so that the feed within the mixing tank will be forced from either end toward the center.

A further object of this invention is to provide a feed mixer that is provided with a vertical enclosed conveyor and a plurality of finger blades at the top of the conveyor so that the feed within the mixer may be lifted and spread out toward either end of said mixing tank for further mixing.

Still another object of this invention is to provide a forced feed inlet to a mixing tank in combination with a molasses charging perforated

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pipe to spray the molasses on the feed as it is charged into the mixing tank.

Another object of this invention is to provide a feed mixing tank that is formed with a round trough at the bottom of said tank and in which a single rotor is mounted across the complete trough area of said tank and in which a plurality of paddle shaped radial blades are affixed to said rotor and are mounted in two groups, the blades of one group having a conveyor pitch in one direction while the blades of the other group have a conveyor pitch in an opposite direction so that the rotor while turning the mix through the trough area also propels the feed being mixed from both ends of said tank toward the center thereof and a conveyor positioned at the center to elevate the feed and spread the feed outward back onto the opposite ends of the tank to continue the mixing operation.

Other objects of this invention may be apparent by referring to the accompanying detailed description and the drawings in which

Fig. 1 illustrates a plan view of the mixer,

Fig. 2 illustrates an end elevational view of the mixer,

Fig. 3 illustrates a cross sectional view taken on line 3-3 of Fig. 1,

Fig. 4 illustrates a cross sectional view taken on line 4-4 of Fig. 2,

Fig. 5 is an elevational view of a pair of rotor blades,

Fig. 6 is an end view taken on line 6-6 of Fig. 5, and

Fig. 7 is an end view taken on line 7-7 of Fig. 5.

Referring to the drawings, I have illustrated in Figs. 1 and 2 the complete apparatus and in this particular instance I have shown the apparatus as mounted to a frame extension 10 of a portable automotive mill (not shown). With such a mill the center shaft 11 of the mill may be utilized as the main drive shaft for the mixer. A tank 12 is supported on one side of the frame 10. The particular arrangement and positioning of the tank in this instance is due to the mill and its conveyors that must be mounted adjacent to the mixer. The general arrangement illustrated is to provide a compact mill and mixer unit mounted on the same frame 10. The tank 12 is illustrated with a round troughlike base portion and at one end of said tank 12 there is a collector unit 15. The collector unit is illustrated with a hopper mouth formation 16 which converges into an inlet that is located directly over a worm conveyor 17, the worm conveyor

being mounted within a housing and the housing being affixed to the side of the tank 12. The worm conveyor 17 is provided with an extended shaft 19 at one end thereof, the shaft 19 being mounted in a bearing 20. This supports the worm so that the opposite end may project into an inlet opening 21 in the side of the tank 12. Shaft 18 at its bearing end is provided with a sprocket 22 and a chain 23 is mounted about the sprocket 22 while a sprocket 24 is mounted on the main drive shaft 11 so that the chain 23 may be mounted about the sprocket 24.

Thus the shaft 11 will provide the power to drive sprocket 24, that may be keyed thereto, and the chain 23 and sprocket 22 and in turn shaft 19, that may be keyed to sprocket 22, and thus drive the worm 17. Thus it is apparent that the feed that is ground and charged into the collector 15 will by means of the hopper 16 be stored above the housing 13 and worm 17. With the operation of the main drive shaft 11 it is apparent that the worm 17 will be rotated in a proper direction to force the feed that enters the housing 18 along the housing and through the inlet port 21 and be charged into the tank 12. The tank 12 is provided with a rotor shaft 30 mounted centrally through the trough area 14 of the tank. Shaft 30 is also provided with a sprocket 31 on the exterior of the tank 12. A speed reducer 32 is positioned adjacent to the power driven shaft 11 and by means of a pair of pinion gears 45 and 46 the speed reducer may be driven directly from the power shaft (not shown). The speed reducer is in turn connected by means of a sprocket 33, a chain 34 and a sprocket 35 to a countershaft 36. The countershaft 36 is provided with another sprocket 37 which is connected by means of a chain 38 to a sprocket 39 that is affixed to the rotor shaft 30. Thus although the drive shaft may be driven at a high R. P. M. by means of the speed reducer and the connected sprockets and chains, it is possible to drive rotor shaft 30 at a slow rate and with considerable power due to the speed reduction. Shaft 30 is provided with a plurality of rotor blades 40. The rotor blades are arranged in two sets, one set 41 is mounted on the rotor between the inlet end of the tank and the center of the tank while the other set 42 is mounted between the opposite end of the tank and the center of said tank. The blades comprising the group 41 are equally spaced along shaft 30 and are provided with a conveyor pitch so that with a clockwise rotation of shaft 30 they will force the feed entering tank 12 toward the center of the tank, while the blades comprising the group 42 are likewise spaced equally along shaft 30 between the opposite end of tank 12 and the center thereof and these blades are provided with a conveyor pitch so that as shaft 30 is rotated clockwise they will force the feed that may accumulate at that end of the tank toward the center of said tank. Mounted centrally within the tank 12 there is a vertical conveyor 50. The conveyor 50 is formed as a tube 51 supported between the blades 40 and adjacent to shaft 30 and extending to the bottom of the trough area 14 (Fig. 3). The conveyor rotor may be a worm 52 as illustrated in Fig. 3. The conveyor worm extends upward through the tube 51 and at the upper end of the tube 51 there are provided a plurality of finger blades 53. The blades 53 are provided to receive the feed that has been elevated by the vertical conveyor and to distribute or spread out the feed as it accumulates at the upper end of the vertical conveyor. Also mounted

within the tank 12 is a molasses supply pipe 60. This pipe is positioned directly above the inlet 21 and the pipe 60 may be perforated along its length. The pipe 60 is in turn connected to an inlet pipe 61 which may in turn be connected to a supply tank (not shown) and a valve (not shown) may be utilized to turn on and off the molasses supply as needed. Tank 12 which is illustrated as a completely enclosed tank is provided with a pair of sacking spouts 70 and 71. The sacking spouts are positioned so that 71 is adjacent to the center of tank 12 while 70 is adjacent to the end of the tank 12 opposite to the charging end. The spouts 70 and 71 as illustrated in Fig. 3 are connected to the tank 12 externally and are provided with a slide gate 72 so that an operator may position a bag or receiving device directly under the spout and by lifting the slide 72, the mixed feed will be charged through the spout into the bag or receiving device.

The rotor blades 40 as illustrated in Figs. 5, 6 and 7 are provided with a central hub 80 and a pair of blades 81 and 82 either side thereof. Blade 81 is provided with a paddle shaped end portion 83 and blade 82 is provided with a paddle shaped blade 84 at the end thereof. It is to be noted that blades 81 and 82 are set approximately 45° to the central axis of the shaft 30 to which they are attached by means of the hub 80. It is also to be noted that although blade 81 extends in one direction it is 45° to the shaft 30. Blade 82 will be at 90° to blade 81 but still remain at 45° to shaft 30. It is also to be noted that the ends 83 and 84 are slightly larger than the blades 81 and 82 to which they are attached. This is to provide not only a scrapping action as the blade is rotated through the trough area 14 of tank 12 but they are shaped in this manner to permit a mixing or agitating action rather than simply a conveyor or pushing action. However with the blades set in this angular form they do provide the conveyor pitch and with their rotation the feed that they contact will be not only turned over and mixed but will be pushed toward the center of the tank.

The operation of the device is quite simple with the structure as described. The ground feed is emptied into the collector 15 and with the drive shaft 11 operating the worm 17 will pick up the feed from the collector forcing it or charging it into the tank 12. With the molasses line 61 open the molasses will be sprayed through pipe 60 onto the feed being charged into tank 12. This initial spray on the feed being charged therein does not form a feed ball as the rotor blades immediately move and mix the initial feed charge and the molasses as it is sprayed thereon thus providing a most important agitation to prevent a balling of the feed by the introduction of the molasses. The ground feed and molasses will then be forced by the conveyor mixing blades of the rotor toward the center of the tank 12. The mixed feed and molasses will in turn be picked up at this point by the vertical conveyor 50 and the mixed feed and molasses will be spread out by the finger blades 53 toward both ends of the tank 12 and the mixed feed will fall into the mixing rotor blades and continue to be forced toward the center and the cycle of mixing continued until there is a complete mixture. When the operator believes the mix to be sufficiently mixed he may open either or both of the spouts 70 and 71 to sack or discharge the mix for use as desired.

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Various changes or modifications may be made to this device in the manner of charging or in the general design of the vertical conveyor or in the rotor mixing means without departing from the spirit of this invention and this invention shall be limited only by the appended claims.

What is claimed is:

1. A feed mixer which includes a mixing tank, a worm charging conveyor, a collector unit, and a single molasses supply pipe, said mixing tank constructed with converging side walls and a round bottom portion to meet said converging side walls and a shaft mounted through the center of the bottom portion of said tank, a plurality of rotor blades affixed radially about said shaft and spaced actually, said rotor blades divided into two groups each group provided with an opposite conveyor pitch, a vertical conveyor positioned at the center of the mixing tank to elevate the mixed feed, a plurality of finger blades positioned adjacent to the top of the vertical conveyor to spread out the mixed feed to either end of said mixing tank, means to charge feed into said collector, means to rotate said charging worm, said radial blades and said vertical conveyor in said mixing tank, means to charge the feed into said mixing tank.

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2. In a device according to claim 1, a pair of sacking spouts connected to the lower portion of the mixing tank, said spouts positioned adjacent to the portion of the tank where the feed is completely mixed.

3. In a device according to claim 1 said rotor blades provided with an enlarged paddle shaped scraper end.

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