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DISINTEGRATING MACHINE

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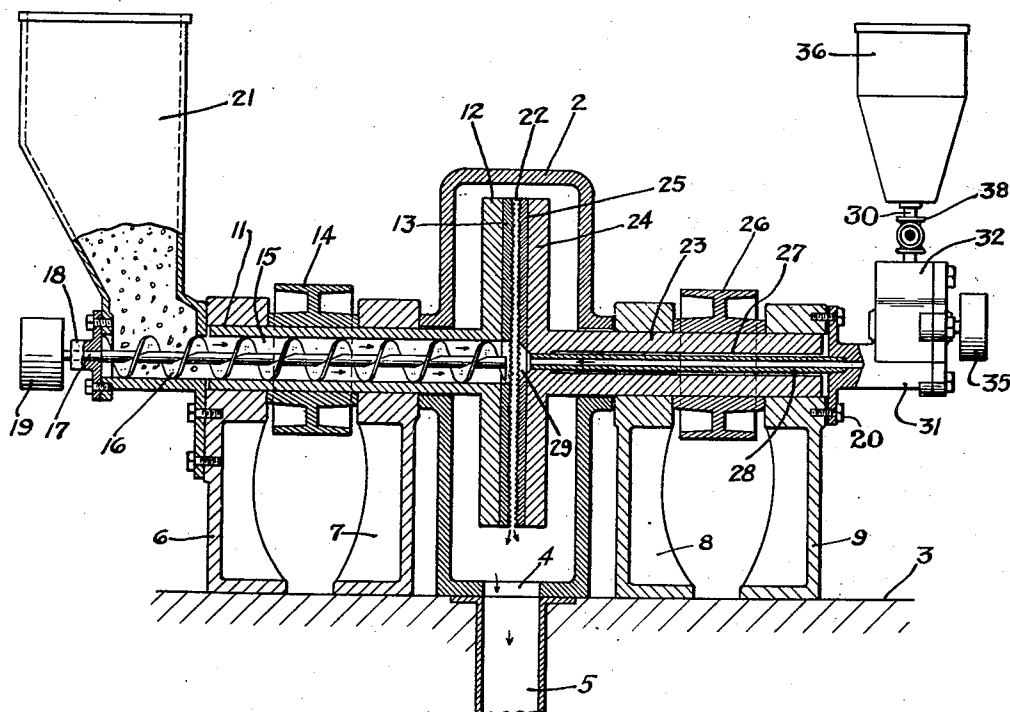


FIG. 1

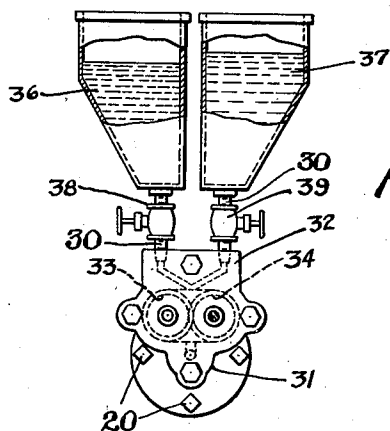


FIG. 2

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DISINTEGRATING MACHINE

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1 Claim. (Cl. 83-93)

This invention relates to new and useful improvements in disintegrating machines, and more particularly to such machines adapted for grinding grain and other material to be used
5 as a stock feed.

It is now more or less common to intermix molasses or cod liver oil with ground grain to increase the food value thereof. The most common way of doing this, at the present time, is to
10 introduce the molasses or cod liver oil into the material, after it has been ground, and this requires that the ground grain and molasses or other liquid material be suitably stirred or agitated by suitable means provided for that purpose, in an attempt to thoroughly intermix the
15 molasses with the ground grain, in order to obtain a uniform mixture. This manner of intermixing the molasses with the grain has not proven very satisfactory, primarily, because of the sticky, tenacious nature of the molasses,
20 which causes it to adhere to the ground material in such a manner that the material has a tendency to accumulate in lumps and, as a result, the molasses is not uniformly intermixed with the grain. I have found that if the molasses or
25 cod liver oil or both are introduced into the material, incident to the grinding operation, that the molasses will be thoroughly intermixed with the ground grain, so that a very uniform mixture is provided. To accomplish this, I prefer
30 to feed the grain or material to be disintegrated, and the liquid material to be intermixed therewith, to the grinding elements at substantially the same time, whereby the liquid material passes
35 between the grinding elements simultaneously as the grain is being ground therebetween, whereby the liquid material will be thoroughly intermixed with the ground material during the grinding operation, and without necessitating additional
40 operations for mixing the molasses or cod liver oil with the grain, subsequent to the grinding operation, as is now necessary. The liquid material will also be thoroughly intermixed with the ground grain so that a very uniform mixture is
45 obtained.

A further object is to provide a machine provided with a pair of grinding elements, each having a hollow shaft, and means being provided for feeding the grain or other solid material to be disintegrated through one of said shafts into the space between the grinding elements, and a
50 suitable conduit being provided in the shaft of the other grinding element, through which the liquid material is fed into the space between the grinding elements, simultaneously as the grain is fed thereto, and whereby said liquid will be
55 thoroughly intermixed with the grain, as it is ground between said elements, and whereby additional agitation and mixing of the ground grain and liquid material may be dispensed with, there-

by greatly simplifying the operation of mixing the molasses or cod liver oil, or both, with the ground grain, and at the same time, expediting the operation.

An object of the present invention, therefore, 5 resides in the provision of a disintegrating machine having means embodied in the construction thereof, for simultaneously delivering grain and a suitable liquid material into the space between the grinding elements thereof, at the axis
10 of said grinding elements, whereby the liquid is discharged from between said elements simultaneously as the ground grain discharges therefrom, so that substantially every particle of the grain will be coated more or less with the liquid
15 material before the ground material is delivered into a suitable receiving means.

Other objects of the invention reside in the simple and inexpensive construction of the machine; in the novel mechanism provided for
20 feeding the liquid material between the grinding elements, and whereby a plurality of different liquid materials may be delivered into the machine simultaneously in controlled amounts; and, in the means provided for accurately controlling
25 the supply of liquid material to the grinding elements, whereby the desired percentage or quantity of liquid material may be intermixed with the ground grain discharging from the machine.

Other objects of the invention will appear from the following description and accompanying drawing and will be pointed out in the annexed claim.

In the accompanying drawing there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claim which
40 follows.

In the drawing:

Figure 1 is a longitudinal sectional view, showing the general construction of the machine; and

Figure 2 is an end view of the mechanism for
45 supplying the liquid material to the machine.

In the selected embodiment of the invention here shown, there is illustrated in Figure 1, for purposes of disclosure, a disintegrating machine of more or less common construction, comprising a housing 2, which preferably is constructed
50 of two parts, whereby access may be had to the interior thereof. The housing is shown supported upon a suitable foundation 3 and has a discharge opening 4 communicating with a receiving spout 5.

Bearing pedestals 6, 7, 8, and 9, are shown supported upon a foundation 3, and the pedestals 6 and 7 support a hollow shaft 11 having secured to its inner end, a grinding disk 12, to which is
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secured suitable face plates 13 provided with a grinding surface, as is well-known in machines of this general character. A pulley 14 is shown secured to the shaft 11, whereby it may be driven from a suitable source of power, not shown.

The shaft 11 has a bore 15 in which is mounted a feed screw 16. This feed screw has a shaft 17, one end of which projects from a bearing 18, and has a suitable pulley 19 secured thereto, whereby the shaft may be driven. The screw 16 passes through the lower end of a suitable hopper 21, into which the material to be ground is delivered, and from the bottom of which it is fed into the gap 22 between the grinding elements of the machine by the feed screw 16.

A shaft 23 is rotatably mounted in the pedestals 8 and 9 and has a disk 24 at its inner end, similar to the disk 12, which, in like manner, is provided with suitable face plates 25, provided with a grinding surface, which cooperates with the adjacent grinding surface of the face plate 13, to disintegrate or grind the material delivered between said elements. The shaft 23, like the shaft 11, has a pulley 26 secured thereto, whereby it may be driven from a suitable source of power.

The shaft 23 is shown provided with an axial bore 27, in which is shown mounted a conduit 28, the inner end of which terminates in an outwardly flared opening 29, shown provided in the face plate 25 of the disk 24, as clearly illustrated in Figure 1. The opposite end of the conduit 28 is connected to a suitable pump 31, comprising a casing 32 having cooperating elements 33 and 34 mounted therein, adapted to be driven by a pulley 35 connected to a suitable source of power, not shown. The elements 33 and 34 cooperate to provide a gear pump for feeding the liquid material through the conduit 28 into the spacing 22 between the grinding elements 12 and 24. The pump 31 may be secured to the end pedestal 9 by suitable bolts 20.

The liquid supply means is preferably constructed as shown in Figure 2, and comprises two hoppers 36 and 37, one of which may contain molasses and the other, cod liver oil, or any other liquid material to be intermixed with the ground grain. The lower or discharge ends of the hoppers 36 and 37 may be connected by suitable pipes 30, to the housing 32, as shown, and the pipes 30 are provided with control valves 38 and 39, respectively, whereby the supply of liquid material to the grain may be accurately controlled.

In the operation of the novel machine, herein disclosed, the grain is delivered into the hopper 21, and is fed into the gap 22 between the grinding elements at the axis thereof. The grinding elements, it is to be understood, rotate in opposite directions and, as they are rapidly rotated and the grain is fed therebetween, the latter is ground or disintegrated by the abrasive action of the grinding surfaces of the disks 12 and 24, whereby the material is disintegrated or reduced, to the desired degree of fineness, and discharged by centrifugal force from between the grinding disks into the housing 2.

Simultaneously, as the grain to be disintegrated, is delivered to the disks, a liquid material is delivered into the space between the disks 12 and 24 by the action of the pump 31, controlled by manipulation of the valves 38 and 39. As the liquid material is thus delivered into the space between the grinding elements at the point of de-

livery of the grain, it will readily be understood that, as the grain moves outwardly from the center of the disks, and is ground or disintegrated therebetween, the molasses or other liquid material fed to the grinding elements will become thoroughly intermixed with the grain, so that when the ground grain is discharged from the space 22 at the periphery of the grinding elements, substantially every particle of the ground material will be coated with molasses, or whatever liquid material is introduced between the grinding elements.

By thus intermixing or applying the liquid to the grain, simultaneously as it is ground between the grinding elements 12 and 24, the liquid material is applied to the grain simultaneously as it is ground, whereby the usual operation of subsequently intermixing the liquid material with the ground grain, is dispensed with, and the liquid material is also much more thoroughly and uniformly mixed with the ground grain.

The apparatus, as shown in Figure 1, is so constructed that the quantity of liquid material delivered into the ground grain may be conveniently controlled at all times, during the operation of the machine. Should it be desired to intermix both molasses and cod liver oil or some other liquid material with the grain, such material may readily be introduced in the grain, in the desired quantities, by manipulation of the control valves 38 and 39. As shown in Figure 2, the liquid materials contained in the hoppers 36 and 37 are preferably delivered to the same pump, whereby, if both molasses and cod liver oil is to be introduced into the grain simultaneously, these two liquid materials will pass through the pump, where they may become thoroughly intermixed with each other before being discharged from the conduit 28 into the gap between the grinding elements.

By introducing the liquid material, as herein disclosed, I have found that variations in the temperature of the liquid will have little or no effect upon the operation of the machine provided, of course, that the liquid material will flow through the valves 38 and 39 into the pump 31. The pump is preferably of the pressure type so that any liquid delivered thereto will be forced through the conduit 28 and into the gap between the grinding elements, as hereinbefore stated.

I claim as my invention:

A food mill for preparing coated ground foods comprising a pair of opposing grinding elements having spaced parallel plates provided with cooperating grinding faces, a supply hopper for food material to be ground, separate supply means for liquid coating material, a shaft for one of the grinding elements having a passageway therein and screw conveyer means in said passageway adapted to deliver food material from said hopper in uncoated condition to the grinding space between the elements, a shaft for the second grinding element having a restricted passageway therein of substantially smaller size than the first passageway, said second passageway being adapted to deliver liquid coating material from the supply means to the grinding space for application to the food material while being ground between the grinding elements, and pressure means for feeding the liquid coating material through said second passageway.

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