May 27, 1941. M. W. HARTMANN 2,243,476

FOOD GRINDING MILL

Filed March 9, 1940

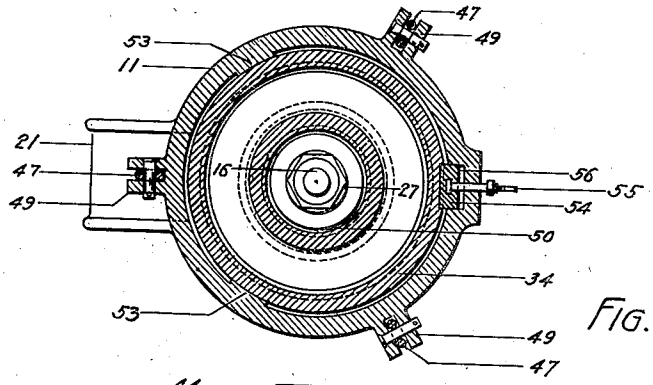


FIG. 2.

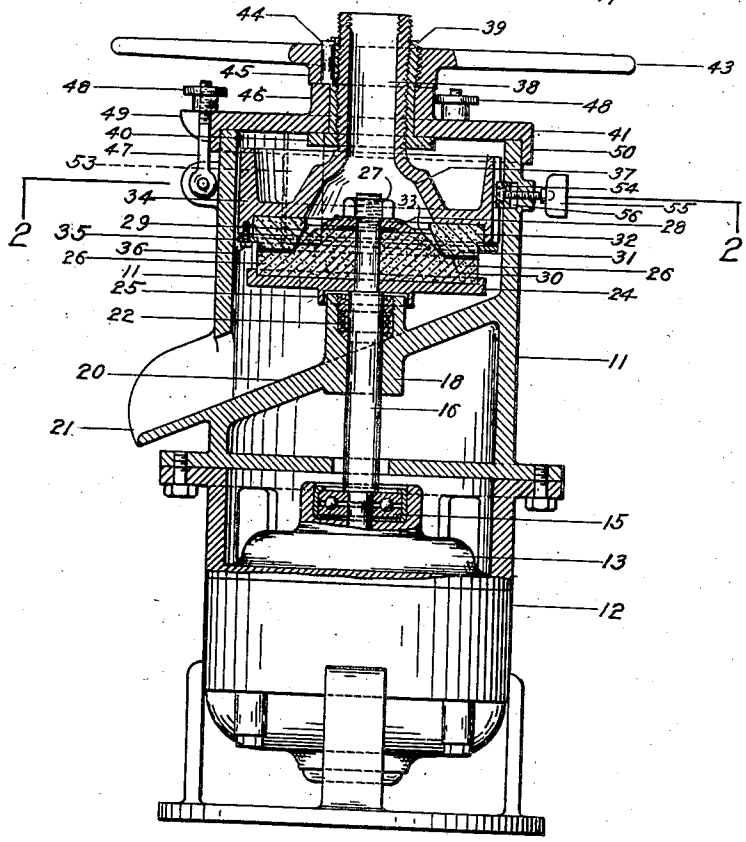


FIG. 1.

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Patented May 27, 1941

2,243,476

UNITED STATES PATENT OFFICE

2,243,476

FOOD GRINDING MILL

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Application March 9, 1940, Serial No. 323,178

4 Claims. (Cl. 83—7)

This invention relates to a food grinding mill and in particular to a machine for making paste-like products of finely ground solids in liquids.

An object of the invention is to provide a mill employing horizontal grinding surfaces which may be easily disassembled as for cleaning, and reassembled, without altering the adjustment and alignment of the stator and rotor parts.

Another object is to provide a food mill having means for easily and quickly adjusting the distance between grinding surfaces while the machine is in operation.

Still another object is to provide a durable food grinding mill of simple and inexpensive construction.

These and other objects will be apparent from the description and drawing in which:

Fig. 1 is an elevation, partly in section, showing one form of my invention;

Fig. 2 is a cross-section taken on the line 2—2 of Fig. 1.

In the drawing, a cylindrical mill housing 11 is mounted upon a support, such as the motor housing 12. The motor 13, having a vertical shaft 16, with a thrust bearing 15, drives the grinding member 26. The shaft 16 extends through a partition 20 which forms the bottom wall of the collecting chamber for the ground material. This bottom wall is preferably sloping to drain the product to one side, to the discharge spout 21. A packing gland 22 is provided to prevent leakage of the materials down the shaft.

Upon the shaft 16 is mounted a rimmed table 24 having an overhanging collar 25 over the top of the packing gland 22. On the table 24 within the rim is mounted a grinding member or stone 26 held in place by the flange 28 and the nut 27 on the extension of the shaft 16. The grinding member 26 is provided with a conical center portion 29 tapering down to an outer horizontal rim 30 which constitutes the actual milling surface of the rotor. The stationary grinding member or stone 32 has a horizontal surface facing the grinding surface 30 of the rotary member, and has a tapered aperture whose surface 33 forms with the cone-shaped center portion 29 of the rotor, a throat of gradually decreased opening to feed the material between the grinding surfaces 30 and 31. Coarse particles may be broken down in the throat.

The ring-shaped stator grinding stone 32 is mounted in a rimmed holder 34 by the ring 35 and bolts 36 spaced at intervals around the stone. The holder 34 is provided with a hollow conical hub 37 tapered to the cylindrical portion 38 through which is fed the mixture to be treated. The cylindrical portion 38 is threaded outside, and fits within the threaded bushing 39 having a flange 40 adjacent the under side of the mill cover 41. A handle 43 having a hub 45 is threadedly attached to the outside of the upper end of the bushing 39, a key 44 being provided to prevent turning of the handle 43 on the collar or bushing 39. The vertical position of the stator is adjustable by turning the handle 43 and the threaded bushing 39 attached to it, the hub 45 of the handle bearing upon an up-turned collar 46 in the center of the cover 41. The cover 41 is provided with an overturned edge 50 fitting over the top edge of the housing 11, and is removably held in place by hinged bolts 47 on the housing 11, with nuts 48, fastening over the wings 49.

The inside of the housing 11, near the upper end is provided with two bosses 53 disposed oppositely from a keyway 56 in which key 54 may be moved in and out by the lock screw 55. The bosses 53 with the adjustable key 54 form a three point means of centering the stationary stone holder 34 with the drive shaft 16 and the rotary stone 26, while allowing it to be also positioned vertically by means of the threaded sleeve 39 and the handle 43. A clearance is provided between the stator rim and the inside of the housing, except at the bosses and key contacts, to prevent the difficulties of sticking together of the parts due to the nature of the pasty material which is produced by the machine. When a stator rim is machined to a close fit on its whole circumference with the housing, great difficulty has been encountered in disassembly after use, which trouble is avoided if a wider space is provided, as here.

In using a machine of this type, it is frequently necessary to thoroughly clean the interior, and my structure provides means for doing this easily and quickly, and without disturbing the spacing of the grinding surfaces, nor the rotary alignment of the parts. The head or cover 41, holding the stationary stone holder 37 and the stone 32 may be removed simply by releasing the key 54 by turning the lock screw 55, and by loosening and disengaging the hinged bolts 47 from the wings 49. After cleaning, the cover and stationary stone may be replaced and immediately aligned by putting the rim of the holder 37 against the two fixed bosses 53, and locking the key 54 against the opposite side, and then bolting the cover 41 to the main housing by means of the hinged bolts 47. Material to be

ground is fed to the mill through the opening **56** which may be threaded for attachment to a feed pipe or hose, the mixture of liquid and solid material being milled or intimately mixed or emulsified by passage between the stones, and the product discharged from the spout **21**.

While abrasive grinding stones and wheels are preferred in my mill, it will be apparent that other disk type grinding surfaces may be used including plain or roughened metal surfaces.

By providing for the vertical adjustment of the stationary grinding surface, the rotating parts may be permanently aligned in the bearings, and then are not subject to vibration and consequent wear which so frequently results when the elevation of the rotor is adjustable. The adjustment of the space between the grinding surface may of course be made while the machine is in operation.

The advantages of ease and simplicity of disassembly and assembly without disturbing the previous adjustments between the stones, and maintenance of proper alignment of the parts will be apparent.

While I have described and shown a preferred form of my invention, I do not wish to limit myself to the details of this form, and restrict the scope of my invention only insofar as required by the prior art and the spirit of the appended claims.

I claim:

1. A horizontal disk type grinding mill comprising a housing having its upper interior portion cylindrical in section and having a partition wall below the grinding members, a rotatable grinding disk having a horizontal grinding surface and an upstanding conical center portion at fixed elevation journaled in said wall, a removable cover for said housing, a holder carrying a stationary grinding disk supported by said cover adapted to fit within the cylindrical portion of said housing, means for feeding material to the center of and between said grinding disks, an apertured grinding disk in said holder, means associated with said feeding means for vertical adjustment of said stationary disk, non-adjustable bosses on the interior cylindrical portion of said housing for aligning the holder, and a movable key means opposite said bosses for holding said holder against said bosses.

2. A horizontal disk type grinding mill comprising a housing having its upper interior portion cylindrical in section and having a partition wall below the grinding members, a rotatable grinding disk at fixed elevation journaled in said partition wall, a removable cover for said housing apertured for an extension of a stationary disk holder, a holder for a stationary grinding disk adapted to fit within the cylindrical portion of said housing and having a hollow threaded extension through said cover, a threaded bushing thereon having a collar on the underside of said cover, a handle attached to the other end of said bushing for turning the same, means including said hollow extension for flowing material from the center between the grinding members, a center apertured stationary grinding disk attached on said holder, two bosses on the interior cylindrical portion of said housing adapted to abut said holder, and a removable key means opposite said bosses for holding said holder against said bosses.

3. In a horizontal disk type grinding mill in a housing having a removable cover upon which is mounted a vertically adjustable holder for the stationary disk, means for replaceably aligning said holder with the housing, said aligning means consisting of fixed bosses on the inside of said housing against which said holder may be positioned, a movable key disposed opposite said bosses, and set-screw means in the housing for pressing said key against said holder.

4. A grinding mill comprising a housing having its upper interior portion cylindrical in section and having a partition wall below the grinding members, a grinding disk journaled in said wall at a fixed elevation, said grinding disk having a central conical grinding portion upstanding from a horizontal grinding surface, a removable cover for said housing, a holder for a stationary grinding disk adapted to fit within the cylindrical portion of said housing, a grinding disk in said holder provided with a truncated conical center opening adapted to form with the conical center portion of the rotary disk an annular throat of tapered cross-section leading to the space between the horizontal grinding surfaces of the grinding disks, a tubular means supporting said stationary disk holder communicating with the outside of the mill and adapted for the introduction therethrough of the feed material to the center portion of the grinding disks, fixed bosses on the interior cylindrical portion of said housing for aligning the holder and centering the disks, and means opposite said bosses for holding said holder against the bosses.

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