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H. A. WORMECK ET AL

2,399,153

VERTICAL FOOD CHOPPER

Filed June 9, 1944

Fig. 1.

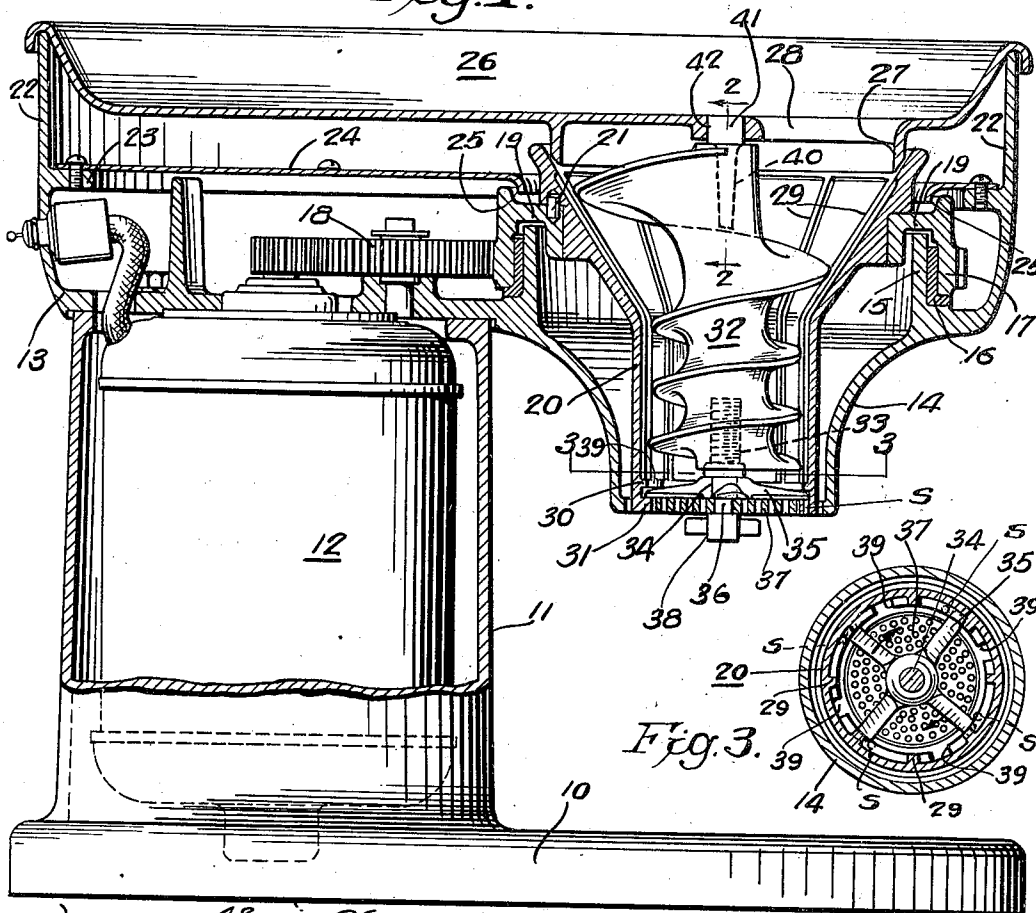


Fig. 3.

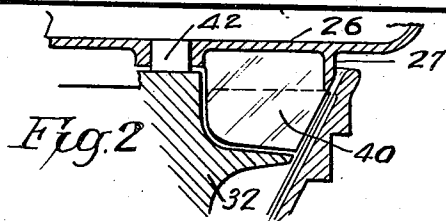
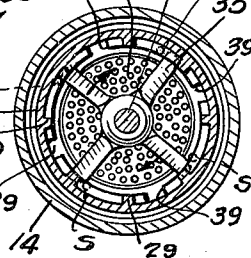


Fig. 2.

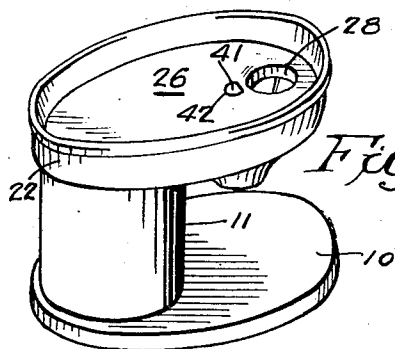


Fig. 4.

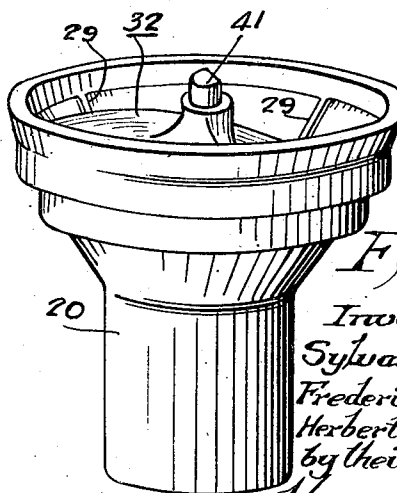


Fig. 5.

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UNITED STATES PATENT OFFICE

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VERTICAL FOOD CHOPPER

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16 Claims. (Cl. 146—192)

This invention relates to food choppers and more particularly to the provision of a power-operated food chopper in which the chopper structure is vertically arranged.

An important object of the invention is the provision in a structure of this character of an arrangement such that all parts of the chopping apparatus may be very readily and rapidly disassembled and assembled to facilitate cleansing operations.

Another object of the invention is the provision of a structure insuring against accidental contact of the food juices with the working parts of the apparatus.

A still further object of the invention is a provision of a novel and improved knife drive for use in apparatus of this character.

These and other objects we attain by the constructions shown in the accompanying drawing wherein for the purpose of illustration we have shown preferred embodiments of our invention and wherein:

Fig. 1 is a vertical sectional view of a food chopper constructed in accordance with our invention;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a perspective view of the apparatus, and

Fig. 5 is a perspective view of the feed screw cylinder with the feed screw in position therein.

Referring now more particularly to the drawing, numeral 10 generally designates a horizontal base, from one end arises a tubular housing 11 for motor 12. Secured to the upper end of this motor housing is a head plate 13, a portion of which overhangs the opposite end of the base from housing 11 and has a hopper 14, the upper end of which, at the upper surface of the lower wall of head plate 13, is defined by an upstanding flange 15. The outer surface of this flange 15 mounts a bearing 16 rotatably receiving a ring gear 17 driven from motor 12 as at 18. The ring gear has extending inwardly therefrom, slightly below the upper surface thereof, an L-shaped flange 19 adapted to receive and guide the upper end of a worm cylinder 20, a dowel being provided at 21 to prevent relative rotation of the ring gear and cylinder while at the same time permitting ready removal of the cylinder by upward vertical movement thereof. The external diameter of the upper end of the cylinder at the point of engagement with the flange 19 is slightly less than the internal diameter of the gear with the result that the upper end of the gear and

cylinder combine to produce with the flange an upwardly opening channel.

The head plate has its perimeter upwardly flanged as at 22, this flange being provided with an inwardly extending ledge 23 supporting a partition plate 24 apertured to permit passage there-through of the cylinder and flanged about this opening as at 25 with a depending flange entering the space between the upper end of the ring gear and the confronting outer wall of the cylinder so that any liquids collecting on the plate 24 will be directed into the channel formed between ring gear and the cylinder. Seated upon the upper end of head plate flange 22 is a tray 26 having upon its lower surface a depending flange 27 entering the upper end of cylinder 20 and closely approximating the inner wall thereof. This tray is formed with an opening 28 disposed eccentrically to the flange 27 and to the upper end of cylinder 20 through which food stuffs may be introduced to the upper end of the cylinder. The cylinder 20 has a funneled upper end and the interior walls of the cylinder are formed with longitudinally extending ribs 29. At its lower end, the cylinder has longitudinally spaced annular flanges 30 and 31 between which are arranged one or more stops, the purpose of which will presently appear.

Within the cylinder is disposed a worm 32, the outer diameter of which conforms to the internal diameter of the cylinder as considered in the ribs. The lower end of this worm is axially socketed for the reception of a stud 33, which stud has adjacent at the lower end of the worm, a cylindrical portion 34 rotatably receiving a knife 35 and below this with a squared portion 36 receiving an extrusion plate 37. The lower end of this stud is threaded for the reception of a retaining wing nut 38. The upper flange 30 is notched to permit passage of the blades of the knife as indicated at 39, these notches being circumferentially spaced from the stops S in a direction retarded as regards the direction of rotation of the cylinder 20 as more clearly shown in Fig. 3. It will be obvious that if the worm with its associated knife and extrusion plate is introduced from the upper end of the cylinder, the blades may be entered through the notches 39 so that they come to rest upon the flange 31 with the result that when cylinder 20 is rotated, they will move through the horizontal portions of the bayonet slots provided between ribs 30, 31 and slots 39 and the worm will thus be locked against any longitudinal movement in relation to the cyl-

inder. Extrusion plate 37 has a snug but readily removable fit with the interior of flange 31.

There is a tendency of material forced through the opening 28 by the fingers or a follower to move in a direction contra to that desired. While this tendency is to a large measure overcome by the engagement of the ribs 29 with the material, we prevent any possible movement in the wrong direction by providing the lower surface of the tray 26 within flange 27 thereof with a barrier rib 40, the edges of which closely approximate the worm and inner cylinder wall. Rotation of the worm is prevented by providing the upper end thereof with a non-cylindrical extension 41 engaged in a similarly shaped opening 42 formed in tray 26.

It will be obvious that with a structure of the type described, the various elements which become soiled in operation may be very readily removed and separated for cleansing. The tray 26 is simply lifted from the structure following which provided reverse rotation of the worm 32 will free the blades from the bayonet slots, the worm may be lifted out separately. If this is not the case, the cylinder and worm may be bodily removed and by removal of nut 38, the unit thus removed may be separated into its component parts. It may be noted that the vertical elements of the L-shaped flange 19 discharges into the upper end of hopper 14 so that any fluid collection in the channel between the cylinder and ring gear will be discharged into this hopper and may be readily removed. It will be noted that partition 24 may be readily removed following which ring gear 17 which has its greatest mean diameter at the teeth thereof may be readily vertically displaced for cleansing should this become necessary.

Since the construction herewith shown and described is obviously capable of considerable modification without departing from the spirit of our invention, we do not wish to be understood as limiting ourselves thereto except as hereinafter claimed.

We claim:

1. In a food chopper, a vertically disposed rotating cylinder having a funneled upper end, a stationary feed screw in said cylinder, a stationary closure for the upper end of the cylinder having a feed opening eccentrically disposed to the cylinder, and a barrier rib on the closure closely approaching the vane of and radial to the axis of the feed screw and arranged near said opening but spaced therefrom in a direction opposed to the direction of rotation of the cylinder.

2. In a food chopper, a vertically disposed rotating cylinder having a funneled upper end, a feed screw in said cylinder, a stationary closure for the upper end of the cylinder having engagement with the worm preventing rotation thereof and having a feed opening eccentrically disposed to the cylinder, and a barrier rib on the closure closely approaching the vane of and radial to the axis of the feed screw and arranged near said opening but spaced therefrom in a direction opposed to the direction of rotation of the cylinder.

3. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, and a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof.

4. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, a knife rotatably supported by said worm and a bayonet slot connection between the knife and cylinder.

5. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, a knife rotatably supported by said worm, a bayonet slot connection between the knife and cylinder, and an extrusion plate stationary with relation to the worm coacting with knife and closing the lower end of the cylinder.

6. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, said tray having a feed opening eccentrically disposed to the cylinder and a rib on the tray closely approximating the adjacent portions of the vane and cylinder and arranged near said opening but spaced therefrom in a direction opposed to the direction of rotation of the cylinder.

7. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, a knife rotatably supported by said worm, a bayonet slot connection between the knife and cylinder, said tray having a feed opening eccentrically disposed to the cylinder and a rib on the tray closely approximating the adjacent portions of the vane and cylinder and arranged near said opening but spaced therefrom in a direction opposed to the direction of rotation of the cylinder.

8. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, a knife rotatably supported by said worm, a bayonet slot connection between the knife and cylinder, an extrusion plate stationary with relation to the worm coacting with knife and closing the lower end of the cylinder, said tray having a feed opening eccentrically disposed to the cylinder and a rib on the tray closely approximating the adjacent portions of the vane and cylinder and arranged near said opening but spaced therefrom in a direction opposed to the direction of rotation of the cylinder.

9. In a food chopper, a horizontal plate having a hopper opening therethrough, a member

rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, said feed tray being removable and the engagement between said cylinder and member being such that said cylinder and worm may be removed as a unit.

10. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, a knife rotatably supported by said worm, a bayonet slot connection between the knife and cylinder, said feed tray being removable and the engagement between said cylinder and member being such that said cylinder and worm may be removed as a unit.

11. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, said tray having a feed opening eccentrically disposed to the cylinder, a barrier rib on the tray closely approaching the adjacent portions of the vane and cylinder and arranged near said opening but spaced therefrom in a direction opposed to the direction of rotation of the cylinder, said feed tray being removable and the engagement between said cylinder and member being such that said cylinder and worm may be removed as a unit.

12. In a food chopper, a horizontal plate having a hopper opening therethrough, a member rotatably surrounding the upper end of the hopper, a cylinder in said hopper supported by said member and held against rotation with relation thereto, a worm in the cylinder, a feed tray for the cylinder supported by said plate and having engagement with said worm preventing rotation thereof, a knife rotatably supported by said worm, a bayonet slot connection between the knife and cylinder, said tray having a feed open-

ing eccentrically disposed to the cylinder, a barrier rib on the tray closely approaching the adjacent portions of the vane and cylinder and arranged near said opening but spaced therefrom in a direction opposed to the direction of rotation of the cylinder, said feed tray being removable and the engagement between said cylinder and member being such that said cylinder and worm may be removed as a unit.

13. In a food chopper, a horizontal plate having a hopper opening therethrough, the upper end of the hopper extending above the upper end of the plate, a member rotatably surrounding the upper end of the hopper and forming an oil seal therewith, a cylinder in said hopper and supported by said member and held against rotation with relation thereto and a stationary worm in the cylinder.

14. In a food chopper, a horizontal plate having a hopper opening therethrough, the upper end of the hopper extending above the upper end of the plate, a member rotatably surrounding the hopper above the plate and forming an oil seal therewith, the member having a flange extending over and into the upper end of the hopper, a cylinder in said hopper supported by said flange and held against rotation with relation thereto and a stationary worm in the cylinder.

15. In a food chopper, a horizontal plate having a hopper opening therethrough, the upper end of the hopper extending above the upper end of the plate, a member rotatably surrounding the hopper above the plate and forming an oil seal therewith, the member having a flange extending over and into the upper end of the hopper, a cylinder in said hopper supported by said flange and held against rotation with relation thereto, and a stationary worm in the cylinder, the upper surface of said flange being disposed below the upper end of the member.

16. In a food chopper, a vertically disposed rotating cylinder having a funneled upper end, a stationary feed screw in said cylinder, a stationary closure for the upper end of the cylinder having a feed opening eccentrically disposed to the cylinder, and a barrier adjacent said opening but spaced therefrom in a direction opposed to the direction of rotation of the cylinder and blocking the channel of the feed screw.

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