July 10, 1934. L. J. PARKER 1,965,905

MIXING MACHINE

Filed Dec. 2, 1927 2 Sheets-Sheet 1

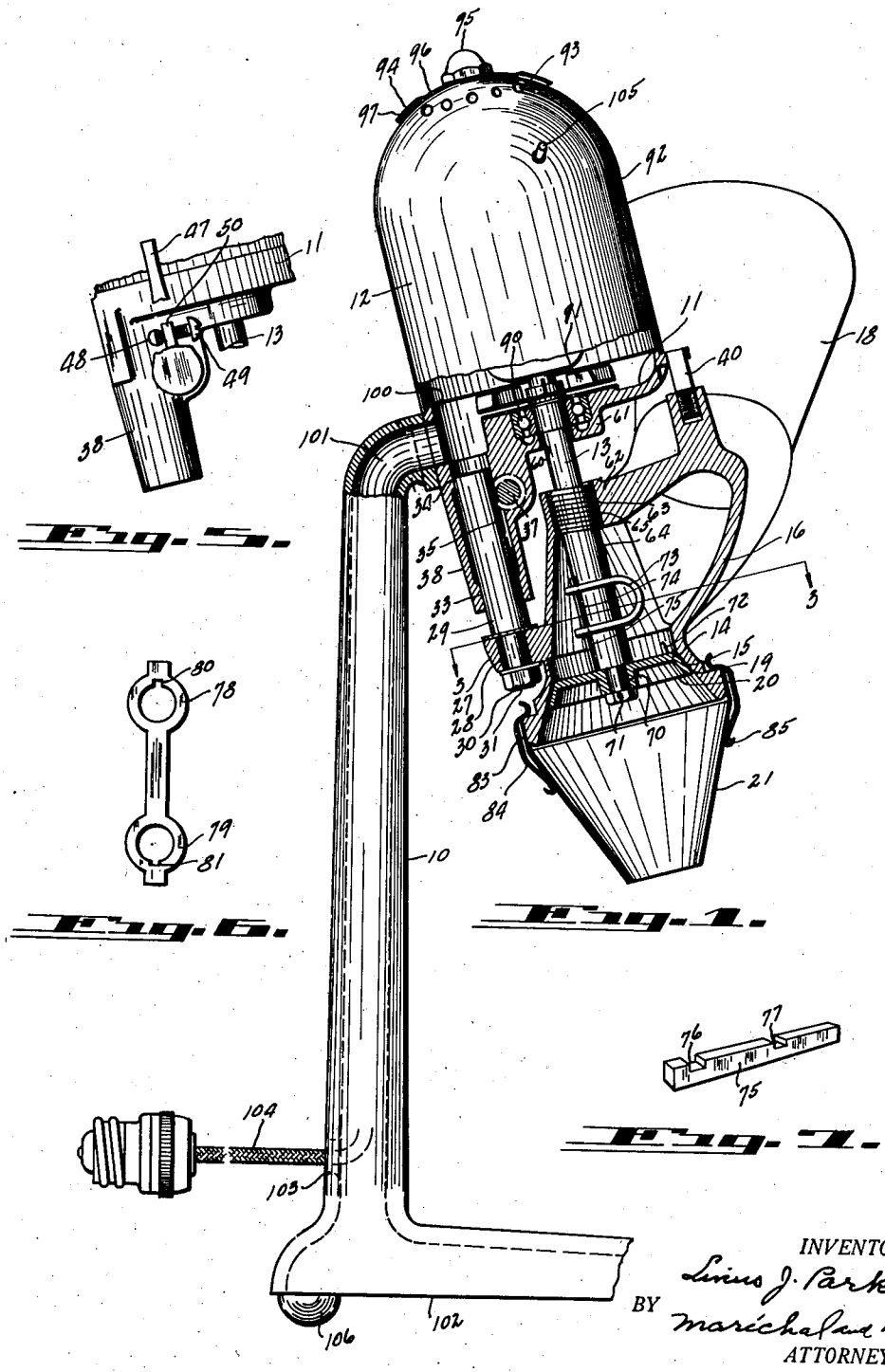


Fig. 5.

Fig. 6.

Fig. 1.

Fig. 7.

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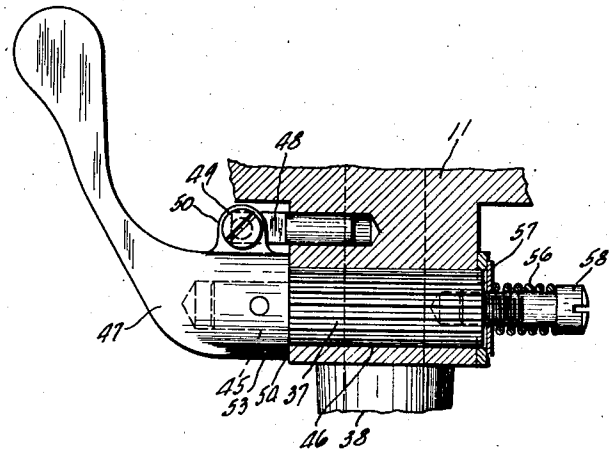


Fig. 4.

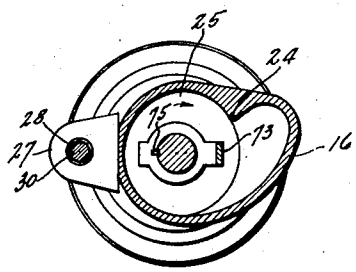


Fig. 5.

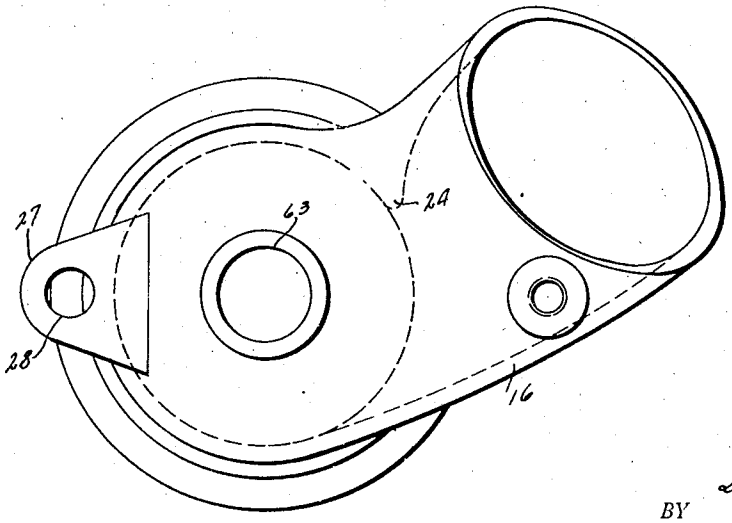


Fig. 2.

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UNITED STATES PATENT OFFICE

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MIXING MACHINE

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Application December 2, 1927, Serial No. 237,158

10 Claims. (Cl. 83—13)

This invention relates to machines for disintegrating mixing or stirring materials and is particularly concerned with machines of this character adapted to handle foods or beverages.

One object of the invention is the provision of a machine of this character having a rotatable spinner arranged closely adjacent a part of a material receiving chamber, the arrangement being such that the chamber may be adjusted to different positions relative to the spinner to adjust the clearance between the adjacent spinner and chamber parts.

Further objects and advantages of the invention relate to certain details of construction providing for ease in cleaning and ease of adjustment of the various parts of the machine, such as are more fully set forth in the following description and in the drawings, in which

Fig. 1 is a side elevation, shown partly in section, of a mixing machine embodying the present invention;

Fig. 2 is a top plan view of the material receiving chamber;

Fig. 3 is a section on the line 3—3 of Fig. 1 showing a portion of the spiral shape of the material receiving chamber;

Fig. 4 is a sectional view of a part of the machine showing the adjusting means by which the spinner clearance is changed;

Fig. 5 is a front elevation of the adjusting means;

Fig. 6 is a developed view of the projection or finger of the spinner shaft; and

Fig. 7 is a perspective view of the spinner projection key.

Referring more particularly to the drawings by reference numerals the mixing machine embodies a hollow upright standard 10 to the upper end of which is fastened a casting 11 which serves as a motor support for the electric motor 12. The motor 12 has an armature shaft 13 which extends downwardly through an opening in the motor supporting casting and carries a spinner 14 at its lower end. This spinner is positioned closely adjacent a throat part 15 of a material receiving chamber 16 which is adjustably fastened to the supporting casting 11. The machine herein disclosed is particularly adapted for the mixing or disintegration of foodstuffs or beverages, which are introduced into the material receiving chamber 16 through a frustro-conical extension 18 of the casing, detachably socketed in the cylindrical upper end thereof. The material entering the chamber is broken up and is rapidly whirled through the small space between the chamber throat portion 15 and the frustro-conical surface 19 of the spinner plate 20 which may be rapidly rotated by the electric motor. The mixed and disintegrated foodstuffs flow down through the guide spout from which they may be collected in any suitable vessel.

The material receiving chamber 16 extends upwardly to provide an upwardly spiraling passage from the throat part 15. The spinner, in the construction shown, is rotated clockwise by the motor when viewed from above, and tends to throw off and splash liquids which are supplied to the hopper, due to the high velocity of rotation of the spinner. This clockwise rotation of the spinner, as indicated by the arrow in Fig. 3, causes a tendency for the liquid to be splashed or thrown off in a direction tangential to the peripheral portions of the spinner. This throwing of the liquid is prevented by reason of the upwardly spiraling form of the chamber 16 which curves outwardly in a generally anticlockwise direction as viewed from above. The inner wall of the chamber 16, as shown at 24, projects inwardly quite a distance at that part of the passage which is on the inside of the spiral adjacent the lower end of the passage. Thus the portion 24 retains any fluid which would tend to be thrown or splashed out of the chamber from the point 25, and thus effectively retains the liquid on which the spinner is operating within the chamber until it passes through the throat opening.

Adjustment of the distance between the conical outer surface 19 of the spinner plate and the adjacent correspondingly tapered inner surface of the throat portion 15 of the material receiving chamber is permitted to provide for a large or for a minimum opening between the relatively rotating surfaces and to permit the interior of the chamber and the spinner to be cleaned after the machine has been used. For this purpose the chamber 16 is adjustably mounted on the supporting casting 11 so that it may be moved in the direction of the axis of the spinner. As seen in Fig. 1, the chamber casting 16 is provided with a rearwardly extending lug 27 provided with a bore 28 which is parallel to the axis of the spinner shaft. A rod 29 has a threaded lower end 30 of reduced diameter extending through the bore 28, the nut 31 which is threaded on the lower end of the reduced diameter portion of this rod serving to fasten the rod and the chamber 16 rigidly together. The upper end of the rod extends through guide surfaces 33 and 34 in the supporting casting 11 and one side of the rod is provided with rack teeth 35 which are engaged

by a pinion 37 rotatably mounted on a horizontal axis in the supporting casting 11. Rotational movements of this pinion or gear 37 in a clockwise direction as viewed in Fig. 1 will result in the elevation of the rod 29 and consequently in the raising of the chamber casting 16 with relation to the supporting casting 11 and with relation to the spinner. If the chamber 16 is raised until the upper end of the lug 27 abuts the lower end of the bearing member 38 which receives the rod 29, there will be a considerable space between the outer peripheral surface of the spinner plate 20 and the adjacent portions of the throat part 15 of the chamber; and when the chamber is thus raised the various parts of the machine within the chamber 16 can be very easily cleaned, and seeds and other food products which have not passed by the spinner when the machine was operating, can be removed. Such retained material is thrown off of the spinner if the motor is running and easily passes through the large space provided outside of the spinner when the chamber is in its raised position. The forward upper portion of the chamber 16 is provided with a guide post 40 which is received in a guide slot in the forward portion of the supporting casting 11 in a slidable manner to guide the upward movements of the chamber.

The gear or pinion 37 by which the raising or lowering of the material receiving chamber is effected is supported upon a transverse shaft 45 or is formed as an integral part of this shaft. The shaft 45 is rotatably mounted in a bearing portion 46 of the supporting casting 11 and to one end of the shaft is fixed a manually operable handle 47 which is preferably located at the left side of the machine so that it can be conveniently operated by the left hand of one using the device. When the chamber 16 is in its lowermost operative position so that a minimum clearance of several thousandths of an inch is provided between the peripheral portions of the spinner and the adjacent throat portion 15, the handle 47 as shown, extends upwardly, and in this position a stop projection 48 provided at the side of the supporting casting 11 is engaged by a stop screw 49 which is threaded in a small lug 50 provided on the handle. The stop screw 49 may be suitably adjusted within the threads of the small lug 50 of the handle so that when the stop projection 48 is engaged the proper clearance is provided between the spinner and the adjacent chamber throat 15 so that these parts will be maintained spaced a little distance apart to prevent them from rubbing upon one another. The spacing between the spinner periphery and the adjacent chamber portion may be easily and quickly adjusted by rotational movements of the lever 47 which may be moved to any position between the two limits as defined by the stop 48 and by the engagement of the bottom of the bearing portion 38 with the lug 27. The shaft 45 and the parts to which it is connected are held in whatever position they are moved to by means of the frictional engagement of the inner end surface 53 of the handle and the end surface 54 of the supporting casting 11. These two surfaces are flat and are perpendicular to the axis of the shaft 45. The end of the handle is yieldingly urged into frictional contact with the surface 54 of the supporting casting by means of a spring 56 which, as shown in Fig. 4, presses at one end against a washer 57 in contact with the end of the bearing portion 46, and at its other end against the head of a screw 58 which is provided with screw threads so as to fasten in place to the end of the shaft 45. By reason of this arrangement the spring exerts a force on the shaft pulling it endwise and maintaining the surfaces 53 and 54 in frictional engagement at all times and thus holds the chamber to whatever position it has been adjusted.

The motor shaft 13 extends downwardly from the motor armature through an opening 60 in the boss 61 of the motor supporting casting. The space between the bottom of this boss and the adjacent upper part of the material receiving chamber 16 slightly exceeds the distance between the upper and lower limiting positions of the chamber. The upper wall 62 of of the chamber 16 is provided with a circular hole 63 and within this hole the motor shaft is provided with a bushing 64 which is rigidly attached in any suitable manner to the shaft. This bushing is provided with external left-hand threads so that as the motor spins clockwise as viewed from above the threads will return any material which may be splashed up and which would tend to pass up through the opening 63. These threads are preferably formed so that the lower sides of the threads extend in a direction generally towards the center of the shaft or at right angles to the shaft axis. The opening 63 in the upper wall of the chamber 16 is slightly larger than the outer overall distance across the threads 65 of the bushing so that the outer parts of the threads will not touch or rub on the inner surface of the opening 63. This slight clearance also permits a slight adjustment of the position of the material receiving chamber with relation to the axis of the motor shaft. To obtain exact coincidence between the axes of the peripheral surface of the spinner and of the correspondingly tapered surface of the chamber throat 15, a slight clearance is provided between the hole 28 in the lug 27 of the material receiving chamber and the reduced cylindrical end 30 of the rod 29, so that the material receiving chamber can be properly placed before the nut 31 is tightened to firmly hold the rod 29 fixed to the supporting lug 27. The guide slot and slide connection 40 at the forward portion of the supporting casting 11 is of a suitable character so as to permit adjustment of the material receiving chamber, the lug 40 preferably being pivoted on the material receiving chamber to permit such adjustments.

The motor shaft 13 extends downwardly within the material receiving chamber and its lower end is reduced in diameter as indicated at 70. The spinner plate 20 is provided with a central hole through which the reduced end 70 of the shaft passes, and a nut 71 threaded on the projecting end of this reduced portion surface rigidly holds the spinner plate in its proper position on the end of the motor shaft. The spinner plate is preferably provided with one or more upwardly extending fingers 72 which project up from the plate so as to be effective in tearing apart and breaking up pieces of solid or semi-solid matter which may be supplied to the material receiving chamber. Such solid or semi-solid material is also broken up or torn apart by means of a projecting arm 73 which is mounted on the motor shaft within the chamber 16. This projecting arm 73 is adapted to be assembled on the shaft by moving it upwardly in the direction of the axis of the motor shaft, and for this purpose the motor shaft is provided with a key slot 74 in w..ich is received a key 75. This key, as shown in Fig. 7, is provided with two cross slots 76 and 77 spaced suitable distances above the top of the spinner plate 20 and adapted to receive the ring

portions of the arm 73. This arm, shown in Fig. 6 in a developed or stretched out state, is formed of a sheet of metal having ring portions 78 and 79 each provided with an opening adapted to receive the motor shaft. Key slots 80 and 81 are provided in these portions of the arm, and the arm is bent into U-shape so that the ring portions 78 and 79 are parallel and spaced apart a distance equal to the spacing between the slots 76 and 77 in the key. The key and the bent U-shaped projecting arm 73 can thus be applied by an upward movement from the bottom of the chamber 16 before the spinner plate 20 is in place. The key slot in the motor shaft is only of sufficient length as to receive the key, and the key is held in place to definitely hold the ring portions 78 and 79 in place by the spinner plate which is fastened to the lower end of the motor shaft.

A material discharge spout 21 is provided to aid in the collection of the material flowing from the machine, the spout being made removable to provide for ready access to the bottom of the motor shaft and to permit the cleaning of the machine. The upper end of the spout fits upon and slidingly receives the cylindrical surface 83 formed on the bottom of the material receiving chamber 16, spring retainers 84 pivoted at 85 to the spout 21 serving to detachably hold the spout in place.

The motor armature shaft is provided with bearings adjacent the upper and lower ends of the armature, the lower bearing being shown at 90 in Fig. 1. This bearing is received in a suitable depression provided in the boss 61 of the motor supporting casting 11. Above the bearing, and below the bottom of the armature winding are fan blades 91 which are fixed to the motor shaft so that when the motor is running the fans will be rapidly revolved and draw air into the casing 92 which surrounds the motor and which is provided with a series of openings 93 adjacent the upper end thereof. Cooling air is thus induced into the casing. To prevent liquid or any other material from entering the openings 93 a curved cap plate 94 is fastened in place to the top of the casing by means of a nut 95 which is engaged with a suitable part of the upper bearing of the motor. The cap plate is provided with a central portion 96 conforming in curvature to the shape of the upper end of the casing, the peripheral portions 97 of the plate adjacent the openings 93 being spaced away from the underlying portions of the casing 92 to provide for a sufficient supply of air through the ventilating holes. The rear part of the motor supporting casting 11 is provided with an opening 100 which communicates with the space adjacent the fan blades 91 and which also communicates with an opening 101 in the upper end of the hollow standard 10. The air which is induced into the motor casing 92 therefore may travel down through the openings 100 and 101 and through the hollow standard 10 and can then flow through the exit opening 102 at the bottom of the standard. The standard is preferably mounted upon feet 106 of rubber or other suitable material so that the free passage of air from the bottom of the standard is permitted. An opening 103 at the rear of the standard also communicates with the hollow interior and permits the cooling air from the motor to be discharged at this place. The electrical connection 104 by means of which power is supplied to the electric motor may also extend through the opening 103, the wires extending up through the standard and through the openings 101 and 100 and then to the motor. A control switch 105 provided in the side of the motor casing 92 permits the starting and stopping of the motor whenever desired.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a mixing device of the class described, a support, a motor mounted in fixed position on said support, a material receiving chamber adjustably mounted on said support, a spinner fixed to the motor shaft and rotatably mounted closely adjacent a part of said chamber, means for guiding said chamber for reciprocatory adjustment on said support, and means for moving said chamber in the direction of the axis of the spinner to adjust the clearance between the spinner and the said part of the chamber, said means comprising a manually rotatable gear having an axis fixed in said support and engaging a rack fixed to said chamber.

2. In a mixing device of the class described, a support, a motor mounted in fixed position on said support, a material receiving chamber adjustably mounted on said support, a spinner fixed to the motor shaft and rotatably mounted closely adjacent a part of said chamber, means for guiding said chamber for reciprocatory adjustment on said support, means for moving said chamber in the direction of the axis of the spinner to adjust the clearance between the spinner and the said part of the chamber, said means comprising a manually rotatable gear having an axis fixed in said support and engaging a rack fixed to said chamber, and an adjustable stop limiting the rotation of said gear in one direction.

3. In a mixing device of the class described, in combination, a hollow standard, a motor support fixed to said standard, an electric motor fastened to said motor support, a case extending over said motor and having holes therein through which ventilating air may pass, a material receiving chamber mounted on said motor support, a spinner mounted on the motor shaft closely adjacent a part of said chamber, fan blades carried by said motor shaft, said motor support having a passage therethrough registering with the passage through the hollow standard and in communication with the space adjacent said blades so that ventilating air for the motor may pass through the hollow standard and through the openings in the said motor casing for the ventilation of the motor.

4. In a device of the class described, in combination, a motor support, an electric motor mounted thereon, a material receiving chamber, a spinner driven by said motor and mounted closely adjacent a part of the said chamber, said spinner having a shaft extending through an upper wall of said chamber and having a threaded portion rotatably mounted within said wall adapted to direct material downwardly into said chamber.

5. In a device of the class described, in combination, a motor support, an electric motor mounted thereon, a material receiving chamber, a spinner driven by said motor and mounted closely adjacent a part of the said chamber, said spinner having a shaft extending through an upper wall of said chamber and having a threaded

portion rotatably mounted within said wall adapted to direct material downwardly into said chamber, the threads on said threaded portion having a slight clearance from the opening in the wall through which they extend to permit adjustment of the axis of the spinner and of the said chamber, and means for supporting the chamber on the motor support to permit adjustment of the position of the chamber in relation to the spinner axis.

6. In a mixing device of the class described, in combination, a support, a material receiving chamber mounted on said support, a spinner rotatably mounted closely adjacent a part of said chamber, means for driving said spinner, said chamber having an upwardly spiraling passage formed so that material is prevented from being splashed out of the chamber.

7. In a mixing device of the class described, in combination, a support, a material receiving chamber mounted on said support, a spinner rotatably mounted closely adjacent a part of said chamber, means for driving said spinner, said chamber having an upwardly spiraling passage formed so that material is prevented from being splashed out of the chamber, and means for adjusting the position of said chamber with relation to said support to vary the distance between the spinner and the said part of the chamber.

8. In a mixing device of the class described having a support and a material receiving chamber mounted on said support, a spinner adapted to be rotatably mounted closely adjacent a part of said chamber said spinner including a shaft, a projection carried by said shaft having a portion surrounding the shaft, and adapted to be applied to the shaft in an axial direction, and key means for holding said projection to said shaft and spacing said projection from said spinner.

9. In a mixing device of the class described, in combination, a support, a motor mounted on said support, a material receiving chamber mounted on said support, a spinner provided at the lower end of the motor shaft and embodying a plate portion mounted closely adjacent a part of said chamber and removably fastened at the lower end of the motor shaft, a projecting arm keyed to the motor shaft above said plate portion and adapted to be applied to the motor shaft by an upward movement in the direction of the axis of the shaft, and means movable axially of the shaft for definitely fixing said arm in position on the shaft, said means being held in place by said plate portion.

10. In a mixing device of the class described, a support, a motor fixedly mounted on said support, a chamber mounted on said support for axial movement with respect to the motor shaft and provided with a material receiving opening at one end and a discharge opening at the other end, a spinner fixed to the motor shaft so as to be rotated thereby at high speed closely adjacent a part of said chamber, a manually operable device offset from the motor shaft and connected to the chamber for instantly relatively adjusting the position of the motor and chamber a substantial amount, and additional means for accurately adjusting the normal operative positioning of the motor and chamber.

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