

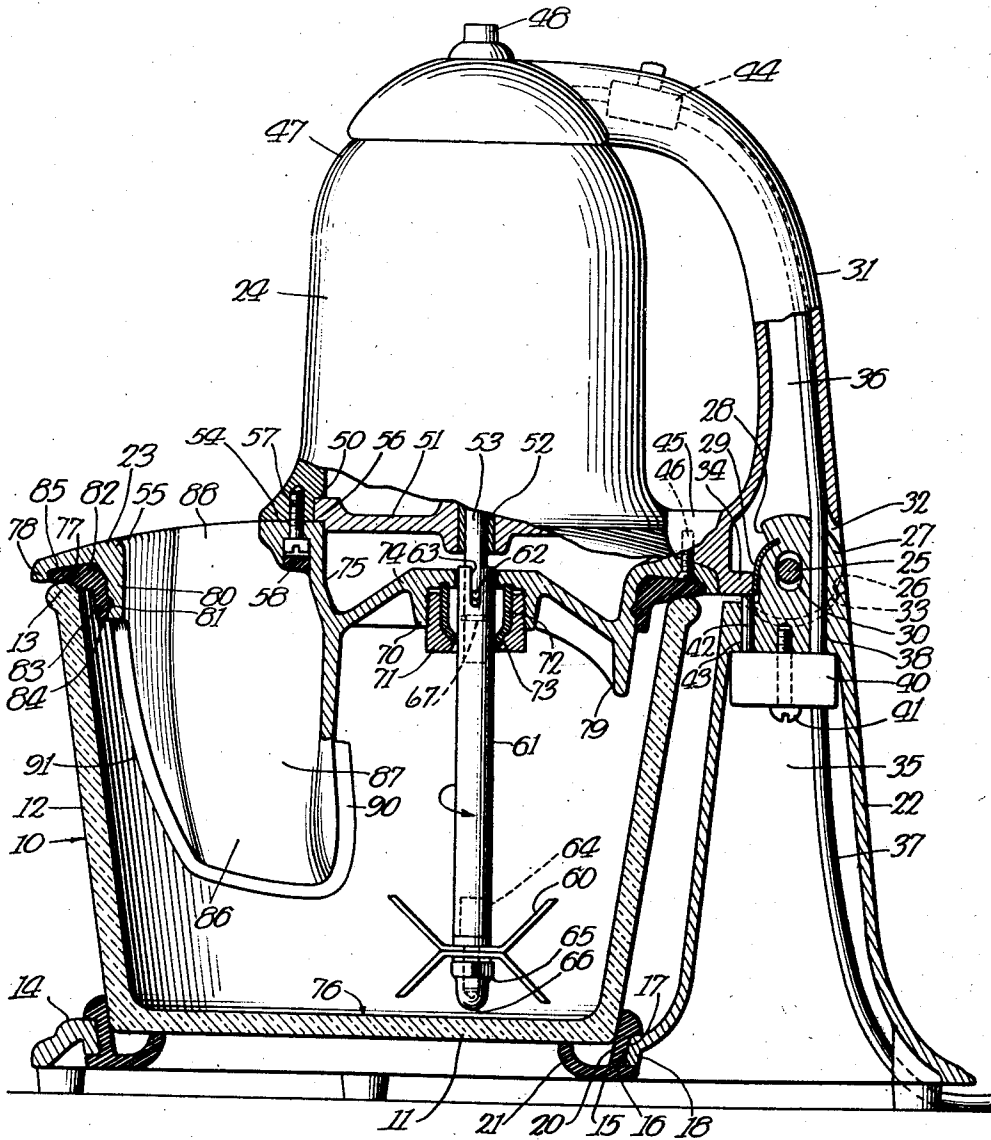
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FOOD MIXER

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FOOD MIXER

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The present invention relates to food mixers and more particularly to mixers wherein solid ingredients are liquified by a high speed cutter to develop a mixture that can be used as a drink.

It has been the conventional practice in building devices of the class described to mount a tall narrow container on top of a power unit and drive the cutters therein by a shaft extending through the bottom, or to provide a wide mouthed bowl with a motor carrying cover that wedge seals itself in the mouth to support beaters in the bowl as driven from the motor.

In view of the fact that the cutters in these particular devices are driven at a very high speed, they provide a hazard for a person's hand if the cutters are accessible. With the conventional constructions, access to the cutters is hampered but not impossible. However, the smallest of the cross-sectional contour of the narrow container augments the swirl of the mixture developed by the cutters due to the reduced circle of travel, and the wedge seal of the cover for large bowls render it impossible to add ingredients without endangering the operator with the cutters.

In order to combat the augmented swirl, containers of special design with peculiarly shaped walls have to be provided to control the swirl and tops have to be provided that prevent swirl spilling. Special constructions and arrangements are quite expensive from a competitive manufacturing viewpoint, and the mounting of the shaft in a pierced bottom wall weakens the container and provides strain points which are significant when the container is struck or subjected to rapid changes in temperature, as when a cold container is rinsed with hot water.

Further dissatisfaction was experienced with tall narrow containers in that the safer they were made regarding access to the beaters, the greater became the factor of uncleanness, it being equally difficult to gain access to the beaters to keep them clean.

In this connection, it is one of the objects of the present invention to obviate these difficulties and provide a construction wherein a standard, inexpensive bowl is used and can be readily replaced at small cost if it is ever broken. Moreover, I provide a new and novel relationship wherein immediate access to all parts contacting food may be had with complete safety. In this manner safety factors regarding contamination of food are improved as well as the safety factors regarding possible physical injuries.

With regard to wide mouthed bowls, difficulty is experienced in directing the solid particles in

the mixture against the cutters so that the solid particles will be liquified quickly. Although some attempts have been made to accomplish this by placing the cutters to one side of the bowl in the path of the swirled contents, the wide area on the opposite of the center of the bowl, is comparatively stagnant and permits ample freedom for the solid particles to be nicked only by the blades and driven away repeatedly without rapid disintegration.

According to the present invention an improved and novel construction is provided wherein a wide container is employed under swirl control conditions that cause a rapid reduction of solid particles to liquid form. In addition to this I provide a means whereby ingredients can be added to the bowl at any time with complete safety and without disturbing the operation of the device in any way.

Moreover, I provide a mixer of the class described, which obviates the difficulty of opening and closing a wedge sealed cover. In the present invention an improved construction is provided either as a separate feature or as a feature in combination with the other features, whereby the top of the bowl is sealed with a readily engaged and disengaged relationship of parts.

Furthermore, I provide a means whereby liquid splashed against the cover will drain back into the bowl, and will not be wasted as is the case with conventional constructions where the cover has to be removed and set down at a place remote from the container when immediate access is had to the conventional container-seal constructions.

These being among the objects of the present invention, other and further objects will become apparent from the accompanying drawing, the description relating thereto and the appended claims.

Referring now to the drawing, the figure shown thereon is a vertical section taken upon the plane of symmetry of a preferred embodiment of the invention showing the improved construction, the relative location and the interrelation of the parts.

Briefly considered, I prefer to support a conventional transparent bowl upon a base which permits the bowl to have a resilient movement vertically and permits the bowl to settle in proper relation to the other parts each time the bowl is removed and returned to the device.

A cover member having a universal sealing contact with the bowl is pivotally supported next to the bowl where it rests against the top of the

bowl in sealed relationship when lowered and can be moved clear of the bowl to afford access to the bowl. The power unit is mounted on top of the cover and the weight thereof alone establishes the sealed relationship which can be broken quickly merely by tilting the cover and power unit.

The motor and cutters are mounted preferably to one side of the center line of the bowl whereby room is provided for a baffle which directs the swirling contents against the beaters, and as a further improvement the baffle may be constructed as a chute for the admission of additional ingredients without disturbing the operation of the cutters.

As a safety factor I provide a means for automatically stopping the motor and cutters whenever the seal between the cover and the bowl is broken.

Referring now to the details of construction, as shown in the drawing, I provide a bowl 10 of a conventional construction made of transparent glass whose bottom 11 is flat and whose sides 12 may be roughly frusto-conical with the wider portion thereof disposed at the top where the edges 13 are rounded and finished without sharp corners.

The bowl 10 is resiliently mounted upon a base 14 as resiliently supported by an intermediate member 15 whose construction is essentially a washer that fits and is supported in an opening 16 in the base, the washer 15 having an annular outer groove 17 adapted to expand in supported relationship over a rim 18 in the base that bounds the opening 16. The inner face of the washer 15 is conformed to center the bowl and in the instance shown is frusto-conical to receive the bottom edge of the bowl in appreciably wedging relationship. At the lower edge of the face 20 an inwardly and upwardly projecting annular flange 21 is provided for resiliently engaging the bottom 11 of the bowl in a bowl leveling manner that assists in establishing the wedging relationship and also supports the bowl against downward movement.

Adjacent to the opening 16 and rim 18, the base 14 is provided with an integral die cast pedestal 22 at the top of which a cover 23, motor 24 and handle 31 assembly is pivotally mounted for movement about a pin 25.

The upper end of the pedestal 22 is cut away upon opposite sides along a circular arc 26 leaving an upstanding central portion 27 which serves as the knife member in a fork and knife hinge. A stop shoulder 28 is provided for limiting hinged movement in one direction and a vertically elongated slot 30 is provided to receive the pin 25 in loose pivoted relationship.

The pin 25 is rigidly carried by the fork elements on the handle 31 as cut away at 32 to receive the element 27 and rounded as at 33 to provide a pleasing outer appearance in relation to the top of the pedestal. A lug 34 is provided upon the handle 31 to engage with the stop 28 when the handle is moved to the right in pivoted relationship, as viewed in the drawing. Vibrational noise between the parts at the pivot joint is prevented by a leaf spring 29 located between the lug 34 and the portion 27 on the pedestal as supported in tensioned position at one end by a slot cut in the portion 27 below the stop shoulder 28.

The pedestal 22 and handle 31 are hollow as at 35 and 36, respectively, to receive the lead-in cord 37, from which the motor 24 receives its

power. The cord extends from the hollow portion 35 to the hollow portion 36 through a drilled opening 38 in the pedestal. An automatic "on" and "off" switch 40 is mounted at the top of the hollow portion 35 by screw 41 where it is connected in the lead line and may be automatically controlled by the lug 34 through an axially movable pin 42 mounted in a bore 43 also provided in the top of the pedestal.

The lead-in cord 37 where it passes through the handle 31 is preferably provided with a multi-position manually controlled switch 44 which serves as an "on" and "off" switch and provides several different speeds for the motor 24.

The lower end of the handle 31 extends inwardly, as at 45, to receive concealed screws 46 that secure the top 23 to the extension 45. At the top of the handle a circular, symmetrically formed portion 47 is provided which covers the top of the motor housing 24 and is secured thereto by a decorative bolt 48 threaded axially through the circular portion 47 into the motor housing 24.

The motor housing, below the circular portion 47, is provided with a pleasing curvilinear contour and comprises preferably a Bakelite member which terminates at the bottom, on the inside, in a recessed downwardly presenting shoulder 50 which receives, in supported relationship, the end wall 51 of the motor. The end wall carries a bearing 52 that journals the motor shaft 53.

The face 54 on the lower end of the motor housing follows the somewhat spherical upper contour 55 of the cover 23, and in this relationship a shoulder 56 flush with the ends 54 is provided upon the end wall 51 whereby the end wall is supported in place between the motor housing and the cover with concealed screws 57 employed to hold the motor housing 24 tightly against the top of the cover 23. In the particular embodiment shown the concealed screws 57 are recessed and rubber plugs 58 are inserted in the recessed portions flush with the top to seal the same from the contents in the bowl 10.

In this manner the motor is supported at one end by the handle and at the other end is secured to the cover in a relationship having two aspects, one of which is that the cover carries the weight of the motor when the cover is lowered upon the top of the bowl, while the handle carries the weight of the motor and the motor in turn carries the cover when the cover is raised or a bowl is absent.

Upon the lower end of the shaft 53 the cutters 60 are mounted by means of a tubular shaft 61. The shaft 61 telescopes over the motor shaft a substantial distance and has a diametrical drive pin 62 therein which engages in diametrically opposed kerfs 63 upon the upper end of the tubular shaft 61. A C spring 67 frictionally holds the tubular shaft 61 on shaft 53 against axial displacement.

Upon the lower end of the tubular shaft 61 a threaded stud 64 is mounted which receives upon the end thereof a round headed nut 65 threaded to tighten under load strains and hold the blades 60 in place against axial and rotary displacement with respect to the shaft 61. The rounded lower end 66 of the nut can rest and serve as an end thrust bearing in relation to the bottom of the bowl, there being enough telescoping relationship between the shafts 53 and 61 to allow for movement of the beaters to the bottom

of the bowl without danger of encountering vibrations between the shafts at high speeds.

The tubular shaft 61 is provided with a seal wherein a downwardly projecting cylindrical flange 70 upon the cover 23 is internally threaded to receive a gland nut 71 that cooperates with a downwardly and inwardly tapering gland washer 72 preferably made of DuPrene. The gland nut 71 has a tapering surface 73 which presses the lower end of the washer 72 inwardly against the shaft 61. This relationship is such that the gland nut and washer terminate at about the same level so that there is little if any opportunity for food particles to collect at this point.

The gland nut is slightly rounded where it engages the washer so that the shaft 61 will be guided and will slip into place after it has been removed and returned. Little if any wear is experienced at the washer and this being the case the square shoulder of the lower end of the washer as it is turned inwardly by the inclined surface 73 serves as a guide which directs the rounded upper end of the shaft 61 readily in place without hindrance.

The cover 23 is made in a single unit of molded Bakelite or a similar substance which I prefer to use in lieu of the expense involved in providing this unit in stainless steel. The cylindrical flange 70, supporting the gland nut 71 is mounted in the top of a dome portion 74 provided for structural rigidity in a downwardly recessed portion 75 made to accommodate the end wall 51 of the motor. This downwardly recessed portion 75 is provided preferably off center the cover with the upper marginal edges thereof locating the end wall 51 of the motor in place so that the cutters 60 are located at a substantial distance to one side of the center 76 of the bowl.

Concentric, however, with the expected center of the bowl the lower face of the cover 23 is provided with a downwardly opening groove 77 whose outer wall 78 is beaded and whose inner wall or flange 80 is of a substantial length downwardly. The inner wall 80 is circumferentially grooved at 81. The bead 78 and the flange 80 collapse between them a rubber washer 82 that is L-shaped cross-sectionally and provided with a ridge 83 engaging in the groove 81.

The washer 82 is made of molded DuPrene whose resting position is one in which the sides of its L cross section are diverged at an angle several degrees greater than they are in their imposed position as shown in the drawing. Moreover, it is preferable that the downwardly extending flange portion 84 of the washer 82 have a diameter at the ridge 83 slightly less than the diameter provided by the groove 81.

In this way when the washer 82 is slipped in place the ridge 83 is under a slight stretch to hold it in place in the groove 81 with the upper and horizontally extending portion 85 of the washer 82 pressing upwardly and outwardly against the head portion 78.

The lower face of the portion 85 is so constructed that when the washer 82 is in place the contour thereof is substantially spherical.

In this way, regardless of slight misalignments between the bowl and the cover, the spherical contour of the washer 82 as a resilient yielding member provides a continuous seal under the weight of the motor 24 when the cover is lowered against the upper circular edge of the bowl 10, and as the bowl settles in place upon the washer 15 and upon the flange portion 21 thereof, the vertically elongated slot 30 permits the weight

of the motor to establish the seal in a manner whereby the bowl is carried between resilient supports in a slightly clamped relationship which can be readily released and reestablished by moving the handle 31 of the motor back and forth.

As a part of the flange 80, a drip lip 79 is provided at the side thereof nearest the pivotal support, so that contents of the bowl that are splashed against the bottom of the bowl will run back into the bowl when the covering is raised. In this way cleanliness of handling is provided with the liquifier not heretofore accomplished with conventional constructions.

Where the cutters are located to one side of the bowl they are located in the path of the swirl they generate. This obstructs the swirl in a manner controlling it, but at the same time provides an area on the other side of the bowl where solid objects are prone to stagnate.

Although I have shown the cutters located at one side of the bowl, it will be understood that the construction about to be described can be used, even in the embodiment shown, with the beaters located nearer or at the center of the bowl.

The cutters in the present invention are constructed to provide a violent propelling action which tends to surmount the obstructing relationship developed in locating the beaters in the path of the swirl, and are located where they catch any solid particles passing below them.

In combination with the augmented swirling and propelling action, I provide a construction which will assist the cutters in their task and control the swirling contents to return them to the cutters quickly and effectively. This construction comprises a baffle 86 cast integrally with the cover 23 as located upon the side of the bowl opposite the beaters where it is constructed with a contour designed to deflect the swirling contents against the cutters as the contents swirl into contact with the baffle. It will be noticed that the baffle preferably does not extend to the bottom of the bowl but in the embodiment shown stops short of the top of the cutters so that the usefulness of the baffle increases with the depth of the liquid in the bowl.

In addition to this, I prefer to construct the baffle 86 as a chute, so that ingredients may be added to the bowl during liquifying operations. In this relationship the baffle is built with a spiral deflecting wall 87 which in relation to the direction of rotation of the cutters deflects the swirl against the cutters.

Upon the face of the wall 87, opposite the face contacting the swirl, an opening 88 is provided in the cover, of a size regulating the size of solid particles that can be introduced into the bowl. Bounding the opening are side walls 90 and 91 integral with the deflecting wall 87 at the inner and outer edges thereof, respectively. The wall 91 structurally reinforces the deflecting wall 87, while the wall 90 protects the cutters from any straight object such as a knife used to force food through the opening 88. Moreover, in this connection, the wall 90 and the length and shape of the deflection wall 87 is such that a person cannot even willfully reach the cutters with a finger inserted through the opening 88.

In this way a new and novel construction is provided for shortening the liquifying time and for adding ingredients to the liquid during operation of the cutters, both of which are safe and apparent to home users unskilled mechanically.

I am able to use a baffle in this particular construction, as shown, since the seal will not be disturbed by the pressure brought to bear against the baffle by solid particles hitting the baffle. The cover will move to the limit of its loose connection between the handle and the pedestal and readapt itself under its universal sealed relationship with the top of the bowl.

In operation, whenever it is desirable to mix or liquify food ingredients, the motor is pivoted upwardly until the lug 34 engages the stop 28 at which point the weight of the motor will be past the center of the pin 25 whereby the motor can be supported in that position while the bowl is being inserted in place upon the washer 18. The cutters and shaft 61 are installed after having been cleaned and dried from previous operations and whatever ingredients are selected, are disposed in the bowl.

The motor is then lowered and the cover with the weight of the motor seals the top of the bowl. The switch 44 is then turned to the speed desired and the cutters are driven to develop the swirl as already discussed, in which the ingredients in the mixer are quickly liquified along with any other ingredients added through the opening 88. The bowl is preferably transparent and the moment the desired liquification is attained the motor can be turned off by the switch 44.

In event, however, the motor is accidentally or intentionally raised without the switch 44 being turned off, the switch 40 will break the circuit at the time or immediately after the seal is broken and will prevent the motor running at any time when the motor is raised above a predetermined point. In this way it is impossible for a person to have his hand in the bowl or insert it in the bowl when the motor is running or have the cutters rotating whenever there is any danger of a hand being injured thereby. In event that the cutters are attached and the motor lowered with switch 44 on without the bowl being located in place, there will be no support for the shaft 61 and if it is subjected to any substantial load as by objects coming in contact with the shaft 61 it is free to drop off and out of engagement with the motor. This serves as an additional safety factor for the users.

In this way I have provided an improved food mixer of the type described within the purposes and objects expressed, and having thus described one form of the invention it will be apparent to those skilled in the art that various uses, modifications and changes may be made without departing from the spirit and substance of the invention, the scope of which is commensurate with the appended claims.

What is claimed is:

1. A food processing device comprising a base, a bowl, resilient means for supporting the bowl upon the base, a support, a motor and cover assembly pivoted to the support, a power line switch for said motor operated automatically in relation to the relative pivotal movement of the assembly and the support, universal sealing means upon the assembly for engaging the top of the bowl in sealed and motor supporting relationship in any one of a plurality of relative positions, and a detachable food processing tool disposable in the bowl and driven from the motor.

2. A food processing device comprising a base, a bowl, resilient means for supporting the bowl upon the base, a support, a motor and cover assembly pivoted to the support, a power line switch for said motor operated automatically in rela-

tion to the relative pivotal movement of the assembly and the support, universal sealing means upon the assembly for engaging the top of the bowl in sealed and motor supporting relationship, a detachable food processing tool disposable in the bowl and driven from the motor, a baffle on the cover assisting the tool in agitating ingredients in the bowl, and vibration dampening means for preventing vibrational noise between the base and the motor.

3. A food processing device comprising a base, a bowl, resilient means for supporting the bowl upon the base, a support, a motor and cover assembly pivoted to the support, a power line switch for said motor operated automatically in relation to the relative pivotal movement of the assembly and the support, universal sealing means upon the assembly for engaging the top of the bowl in sealed and motor supporting relationship so constructed and arranged as to permit a cushioned relative lateral movement under strain, a detachable food processing tool disposable in the bowl and driven from the motor, a baffle on the cover assisting the tool in agitating ingredients in the bowl, and means for introducing ingredients into the bowl without disturbing the cover.

4. In a liquifier, a base, a bowl, resilient means supporting the bowl on the base, a cover for sealing the top of the bowl, a motor carried by the cover and having a shaft extending downwardly through the cover, a high speed food cutter carried by the shaft at the lower end, a seal for the shaft at the upper end and including a washer element directed radially inwardly to wipe the shaft upon insertion, and safety means for automatically stopping the motor when the first mentioned seal is broken.

5. In a liquifier, a bowl, a motor, a cutter driven by the motor and extending into the bowl for liquifying the contents in the bowl, a cover for the bowl, and means for inserting ingredients into the bowl without removing the cover and without danger of fouling the cutter including a baffle shielding direct access to the cutter.

6. In a liquifier, a bowl, a motor, a cutter driven by the motor and extending into the bowl for liquifying the contents of the bowl with a swirling action, a cover for the bowl having an opening therein, and baffle means below the opening on the cover serving as a chute to carry added ingredients into the mix before same contacts the cutters and cooperating with the cutters to return the swirling contents to the cutters after contact with the cutters.

7. In a food mixer, a bowl having a rotary food processing tool therein rotatable about a vertical axis, means for driving the tool, a cover having an opening therein, and a baffle on the cover forming a wall of the opening and preventing contents swirling in the bowl from moving out of the opening.

8. In a liquifier, a bowl, a motor and food processing tool driven thereby for agitating the contents of the bowl, a cover for the bowl, and combination means for assisting in processing the contents of the bowl and for introducing ingredients into the bowl without disturbing the cover including a baffle whose upper edge defines an opening through the cover.

9. In a liquifier, a bowl, power means and a food processing tool extending into the bowl and driven by the power means for agitating the contents of the bowl, a cover for the bowl, a com-

bined baffle and chute on the cover for controlling the action and consistency of the contents.

10. In a liquifier, a bowl, a motor, a cutter disposed in the container and driven by a motor for liquifying the contents of the bowl, a cover, means cooperating with the cutter for deflecting onto the cutter the contents driven by the cutter, and means for introducing ingredients to the bowl without disturbing the cover including an opening, said deflecting means shielding said cutter from damage by foreign articles inserted into the opening.

11. A food processing tool for use in a container and adapted to be driven from the top comprising a tubular shaft with a diametrical kerf at one end and an axially threaded opening at the other, cutter blades supported against axial displacement with respect to the shaft, and an end thrust bearing headed member terminating axially slightly beyond the cutter blades for securing the blades to the threaded end of the shaft and providing a bearing point preventing the blade from striking the bottom of the container.

12. A food processing device comprising a base, a bowl, resilient means for supporting the bowl upon the base to give it vertical yielding support prior to centering the bowl with respect to the base, a support, a motor and cover assembly pivoted to the support including a slot permitting relatively limited vertical movement between the cover and support, a power line switch for the motor operated automatically in relation to the relative pivotal movement of the assembly and support, universal sealing means upon the assembly for engaging the top of the bowl in any one of several sealed and motor supporting relationships, and a food processing tool disposed in the bowl and driven from the motor.

13. A food processing device comprising a base, a bowl, means for supporting the bowl upon the base, a support, a motor and cover assembly pivoted to the support, member including an element enabling limited relative vertical movement therebetween, a power line switch for the motor operated automatically in relation to the relative pivotal movement of the assembly and the support, universal sealing means upon the assembly for engaging the top of the bowl in sealed and motor supporting relationship to permit limited relative lateral movement under strain, a food processing tool disposable in the bowl at one side thereof and driven from the motor, the baffle cooperating with the tool in agitating ingredients in the bowl, and a resilient element for preventing vibrational noise between the base and the motor.

14. In a food processing device having a base, support, and power unit pivotally mounted upon the support for movement about a horizontal axis, the combination of a bowl mounted upon the base below the power unit, a food processing tool

readily detached and secured to the power unit and adapted to rotate about a vertical axis in the bowl, said axis being disposed to one side of the center of the bowl, a baffle member cooperating with the tool to move the contents of the bowl under the swirling action of the tool into contact with the tool, common means for supporting the tool and baffle with respect to the power unit and bowl.

15. In a liquefier, a base, a bowl, means for supporting and centering the bowl on the base in a readily releasable relationship, a self sealing cover for the bowl, a motor carried by the cover, a support on the base, said motor and cover assembly being pivoted to the support, a food processing tool disposed in the bowl and driven by the motor at a rate sufficient to cause splashing and swirling of the contents of the bowl, means for automatically stopping the motor when the cover is raised, and means upon the cover for draining back into the bowl when the motor is tilted any of the contents collected upon the cover.

16. In a liquefier, a base, a bowl, resilient means for supporting and centering the bowl on the base, said resilient means including a yielding weight supporting portion and a portion for engaging the sides of the bowl to center it, a self sealing cover for the bowl, a motor carried by the cover, said weight supporting portion being engaged by the bowl before the bowl engages the centering portion and yielding to bring the bowl in contact with the centering portion under the weight of the cover and motor, a high speed food cutter disposed in the bowl and driven by the motor, and means for automatically stopping the motor when the cover is raised.

17. A cover member adapted to cover the opening in a container including a universal seal, an opening in the cover member to admit food ingredients to the container, a baffle below and defining the opening, a power unit supported on the cover member, and a food processing tool driven by the power unit for agitating the contents of the container.

18. In a device for processing liquid food and having a base and a bowl, the combination of means for supporting and centering the bowl on the base in a readily releasable relationship, a motor and a food processing tool driven by the motor for agitating the contents of the bowl, a cover for the bowl having an opening therein for the admission of ingredients to the bowl and including a baffle cooperating with the tool for controlling the action of the contents of the bowl, said baffle being constructed and arranged to obstruct the splashing of the contents of the bowl out through the opening.

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