Sept. 15, 1936. W. VAN GUILDER 2,054,666

MIXING AND WHIPPING DEVICE

Original Filed June 29, 1933 3 Sheets-Sheet 1

Fig. 4.

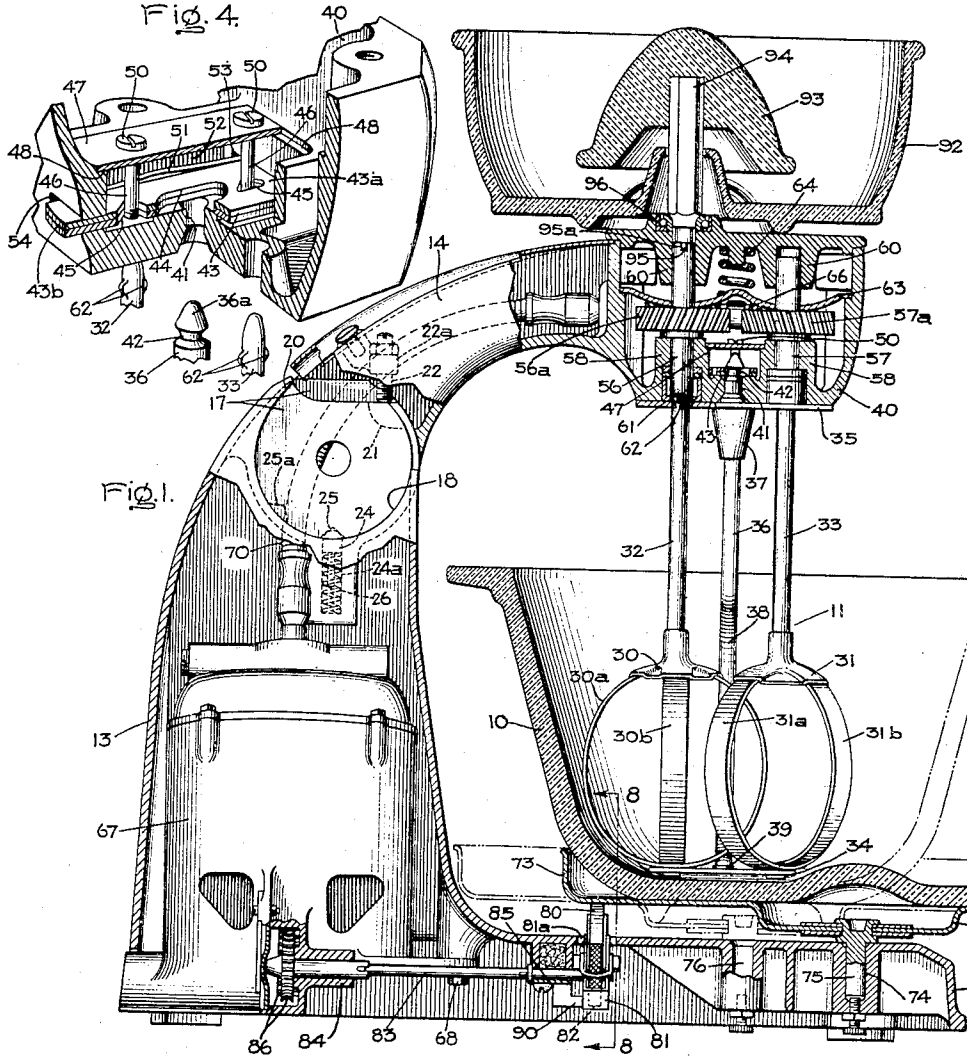
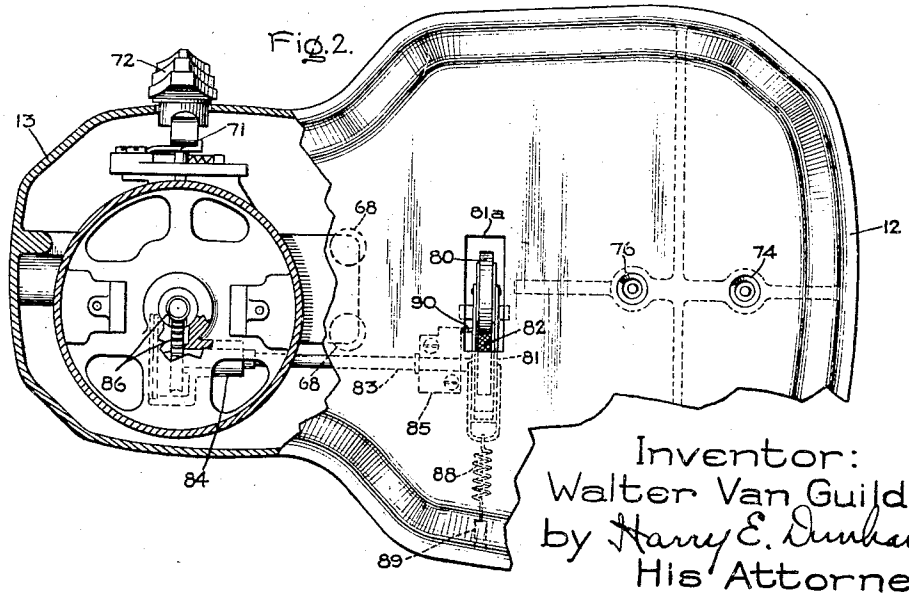


Fig. 1.

Fig. 2.



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Original Filed June 29, 1933 3 Sheets-Sheet 2

Fig. 3.

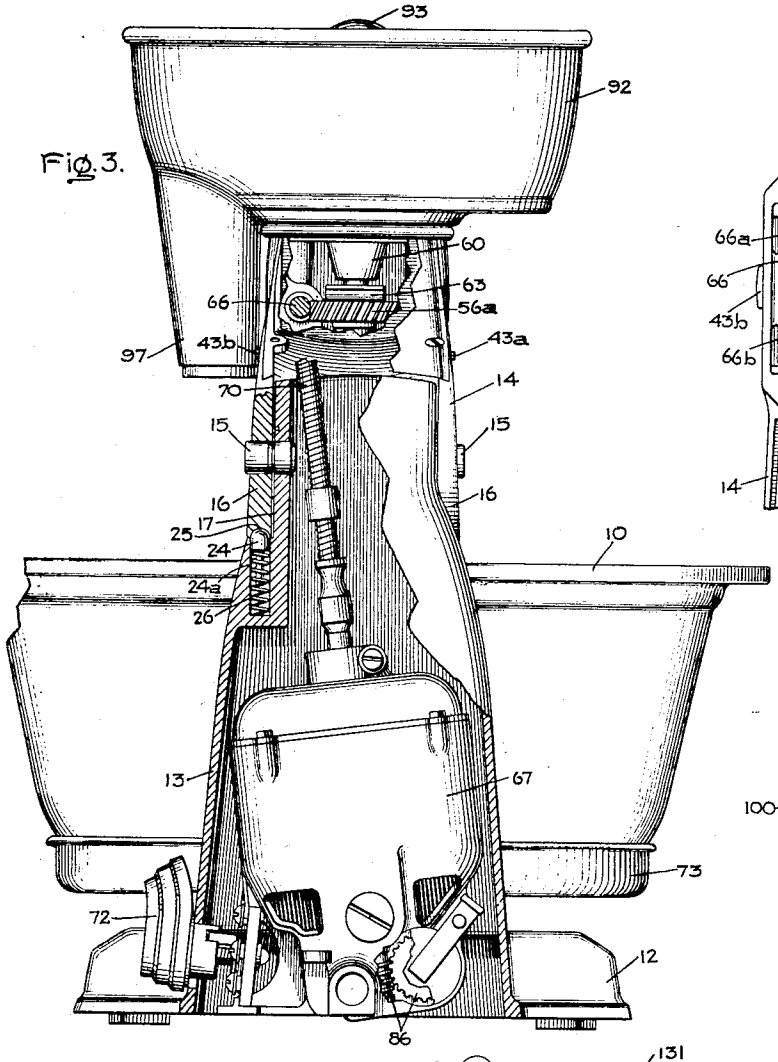


Fig. 5.

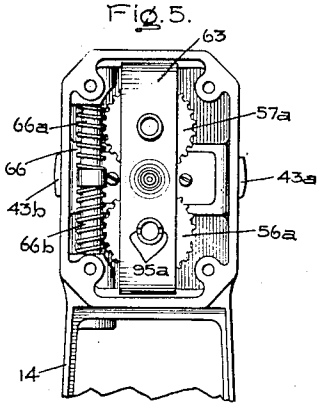


Fig. 6.

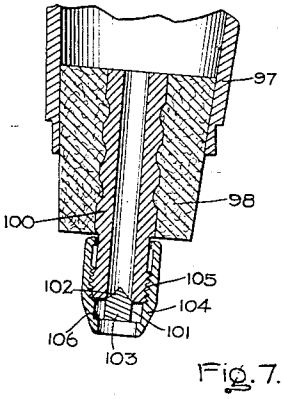


Fig. 7.

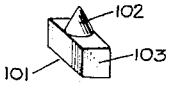


Fig. 11.

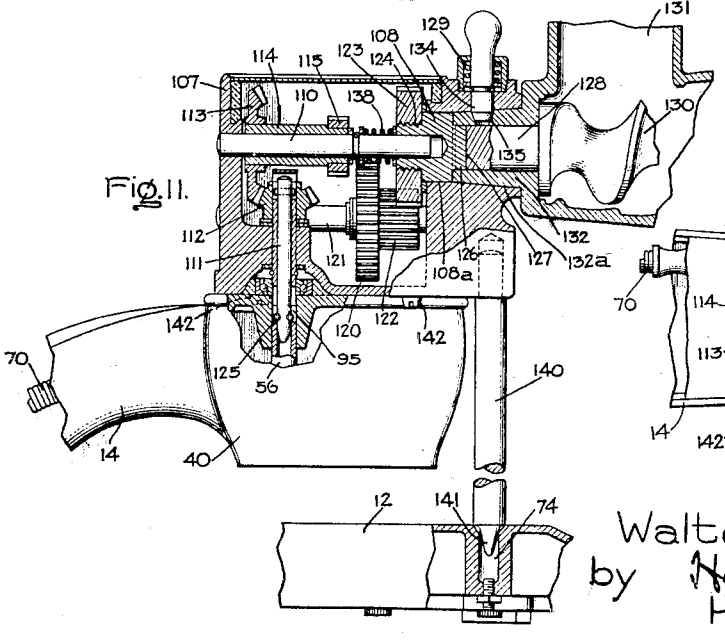
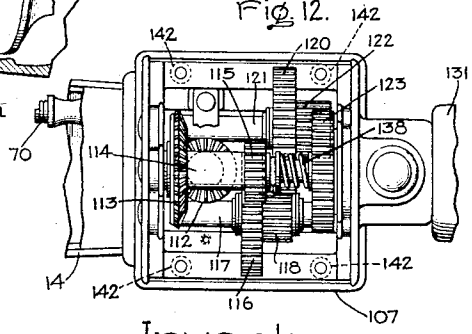


Fig. 12.



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Sept. 15, 1936. W. VAN GUILDER 2,054,666

MIXING AND WHIPPING DEVICE

Original Filed June 29, 1933 3 Sheets-Sheet 3

Fig. 8.

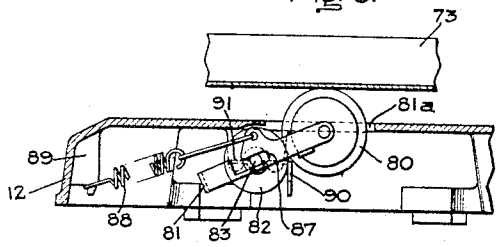


Fig. 9.

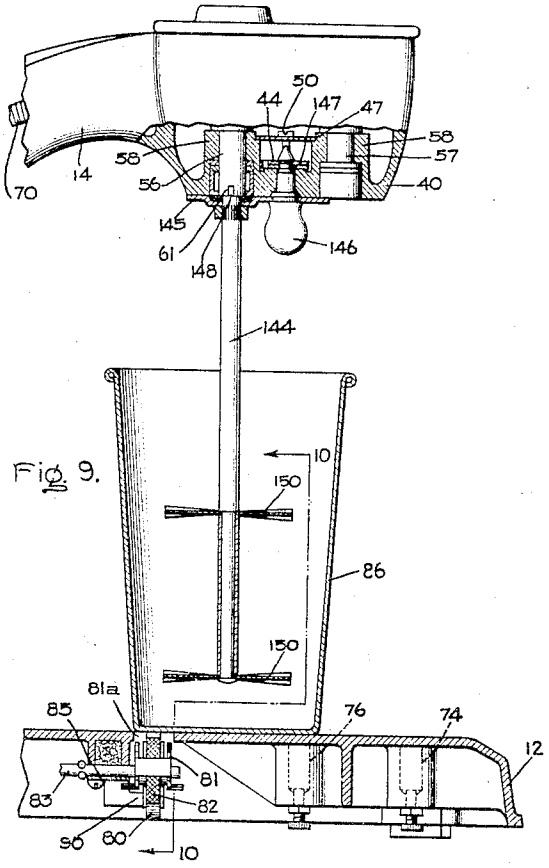


Fig. 10.

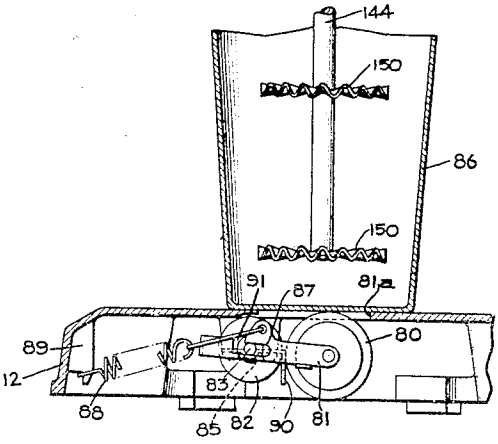


Fig. 14.

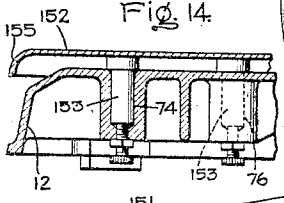
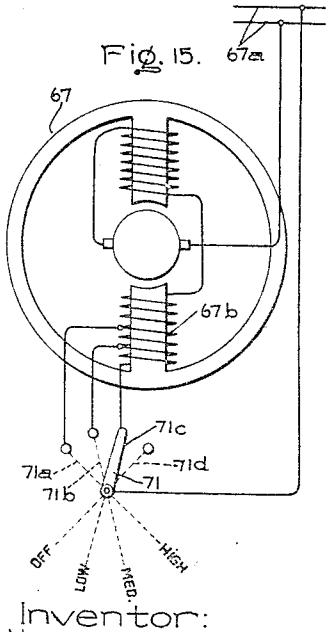


Fig. 13.

Fig. 15.



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Patented Sept. 15, 1936

2,054,666

UNITED STATES PATENT OFFICE

2,054,666

MIXING AND WHIPPING DEVICE

Walter Van Guilder, Stratford, Conn., assignor to Edison General Electric Appliance Company, Chicago, Ill., a corporation of New York

Application June 29, 1933, Serial No. 678,156
Renewed February 8, 1936

20 Claims. (Cl. 259—84)

This invention relates to mixing and whipping devices and the like, more particularly to devices of this nature that are power driven, and it has for its object the provision of an improved device of this character.

This invention has as one of its objects the provision of an improved mixing and whipping device wherein the agitating tool can be conveniently shifted into and out of a food preparation receptacle independently of the driving motor provided for the agitator, that is, the agitator can be shifted into and out of its receptacle without at the same time shifting its driving motor.

Another object of the invention is the provision of improved means for fitting the agitator into its operative position whereby it can be conveniently applied to and removed from the apparatus. And further, the provision of an improved driving connection between the agitator and its driving motor shaft so that the agitator can be fitted into its operative position in any angular position relative to its driving shaft, the driving connection being automatically established when the agitator and its shaft assume the correct angular position.

And still another object of the invention is the provision of means rotatably mounting the food preparation receptacle and of improved means for controlling its rotation in accordance with the consistency of the food material in the receptacle.

In accordance with the invention, a suitable frame is provided which consists, in brief, of a base portion and a hollow standard mounted on the base portion. Mounted on the hollow standard is a hollow arm which is arranged to support the agitator tool in its correct position relative to its receptacle which will be mounted on the base portion. The motor is mounted on the base, preferably, in the hollow standard and is mechanically connected with the agitator tool by suitable means including a flexible shaft which is directed to the agitator tool through the hollow standard and the hollow arm mounted on the standard. The arm supports a gear housing in which suitable reduction gearing is interposed between the flexible shaft and the agitator tool. The arm supporting the gear housing and the agitator tool is pivotally mounted upon the standard so that it can be shifted, together with the gear housing and the agitator, to carry the agitator into and out of the food receptacle. By reason of this arrangement, the agitator tool can be shifted into and out of its receptacle independently of the motor and the base, that is, it can be shifted without the necessity of shifting the motor.

Mounted on the pivotal arm and preferably within the gear housing is a suitable latching device for the agitator arranged when the agitator is applied to automatically engage it so as to lock it in its operative position, and further arranged to release the agitator tool merely by depressing a button which protrudes to the exterior of the housing.

In the specific form of the invention illustrated, the driving means for the agitator includes a tubular shaft mounted in the gearing housing and arranged to be driven through the reduction gearing by the flexible motor shaft. This tubular shaft is arranged to receive the agitator in telescopic relation, and is provided with a suitable clutch arranged to establish a driving connection between the agitator and the shaft when the agitator is inserted in the driving shaft with the two members in a predetermined angular relation. The tubular shaft is mounted for limited longitudinal movement in the gear housing but is biased to its normal operative position, so that if the agitator is applied in any other angular relation than that in which the clutch can be engaged, the tubular shaft will be moved longitudinally in the housing until the motor has been energized to operate the tubular shaft to the correct angular position, whereupon the clutch is automatically engaged.

By reason of this arrangement, the agitator may be applied to and locked to its supporting arm, irrespective of the angular position of the agitator shaft.

The food receptacle is rotatably mounted on the base of the frame and the agitator is so arranged that it will rotate the bowl receptacle by acting on the food in it. Preferably, the agitator will be arranged along one inner side wall of the receptacle so that by rotating the receptacle it will bring all portions of the food in the receptacle into the path of the agitator. Suitable means are provided for controlling the motion of the receptacle by the operation of the agitator in accordance with the consistency of the mixture of the food in the receptacle. This means includes a friction drive for the receptacle operated by the motor and is so arranged that under certain conditions of operation it will impose a braking action on the food receptacle, whereas under other conditions of operation it will function to drive the receptacle, the particular action of the drive being automatically selected in accordance

with the consistency of the food in the receptacle.

For a more complete understanding of the invention reference should be had to the accompanying drawings in which Fig. 1 is a side elevation of a mixing and whipping device embodying the invention, portions being shown in section and portions being broken away so as to illustrate certain details of construction; Fig. 2 is a plan view of the device shown in Fig. 1, a portion being removed and portions being shown in section so as to illustrate certain structural details; Fig. 3 is an end elevation of the device shown in Fig. 1, portions being broken away and portions being shown in section so as to illustrate certain structural details; Fig. 4 is a fragmentary view of a portion of the apparatus shown in Figs. 1, 2, and 3, portions being broken away and portions being shown in section so as to illustrate certain structural details; Fig. 5 is a plan view of a portion of Figs. 1 and 3 with parts removed so as to illustrate certain structural details; Fig. 6 is a fragmentary view in section of a portion of the apparatus used with the device of Figs. 1, 2, and 3; Fig. 7 is a perspective view of a portion of the apparatus shown in Fig. 6; Fig. 8 is a fragmentary sectional view taken through the line 8—8 of Fig. 1 and looking in the direction of the arrows; Fig. 9 is a fragmentary view of a portion of the apparatus shown in Figs. 1, 2, and 3 illustrating certain elements of the apparatus in different operative positions than shown in Fig. 8, and having parts shown in section so as to illustrate certain structural details; Fig. 10 is a fragmentary view of a portion of the apparatus shown in Fig. 9 and taken in section through the line 10—10 of Fig. 9; Fig. 11 is a fragmentary view in elevation of parts of the apparatus shown in Figs. 1, 2, and 3 and illustrating certain auxiliary mechanism adapted to be operated by my mixing apparatus, parts of the apparatus being shown in section so as to illustrate certain structural details, and the auxiliary mechanism being shown in central vertical section; Fig. 12 is a plan view of the apparatus shown in Fig. 11 with a portion removed so as to illustrate certain structural details; Fig. 13 is a view in perspective of the apparatus of Figs. 1, 2, and 3 and illustrating a particular application of the apparatus; Fig. 14 is a fragmentary view in section of a portion of the apparatus shown in Fig. 13; and Fig. 15 is a diagrammatic representation of the control system provided for the driving motor provided for my mixing device.

Referring to the drawings, the invention is shown as applied to a mixing and whipping device comprising a food receptacle 10 in which a suitable agitator 11 is arranged to operate. The receptacle 10 and the agitator 11 are mounted on a suitable frame which comprises a base 12 on which an upright standard 13 is mounted, and an arm 14, also of hollow construction, pivotally mounted on the standard by means of suitable pivot pins 15. The standard 13 preferably will be and as shown is formed integrally with the base.

As shown in Figs. 3 and 13, the arm 14 is provided at its lower end with a pair of hinge lugs 16 which cooperate with a pair of lugs 17 provided on the upper end of the hollow standard 13. The pins 15, as shown, are passed through suitable apertures provided for them in the cooperating lugs 16 and 17. The arm 14 has limited rotative motion on its standard 13. As shown, the standard 13 is provided in its opposite side walls with curved recessed seats 18 in which the lugs 16 of the arm 14 are arranged to move. The left-hand ends of these curved seats 18, as viewed in Fig. 1, form abutments 20, while at the other end of one of these seats is an abutment 21 arranged on the interior of the associated side wall. The two abutments 20 cooperate with the hinge lugs 16 on the arm 14 so as to engage them to limit the motion of the arm 14 in a counter-clockwise direction, as viewed in Fig. 1; the abutment 21 engages an adjustable stop 22 carried on the adjacent inner side wall of the arm 14 to determine the lower operative position of the arm, in which position the arm is shown in Fig. 1. This stop, as shown, is formed as a threaded shank which has a threaded connection with a supporting member or lug 22a provided for it on the inner wall of the arm 14.

The arm 14 is arranged to be secured when moved to either limit of its travel by means of a pair of locking tumblers 24 arranged to be received in suitable spaced apertures 25 and 25a provided for them in each of the hinge lugs 16. As shown, the tumblers 24 are suitably mounted in recesses, 24a provided for them in the standard 13 on its opposite sides in the bottom of the seats 18 directly under the hinge lugs 16 so that they can move into the recesses 25 and 25a provided for them in the hinge lugs. These tumblers 24 are biased to their locking positions by means of suitable springs 26. The recesses 25 and 25a, of course, will be properly spaced so that when the arm 14 is moved to its limiting position in either direction, the tumblers 24 will move into one or the other of the two sets of recesses. It will be understood that while the springs 26 are sufficiently strong to hold the arm 14 against movement due to shocks, vibrations, jars, etc., they will readily give way when the arm 14 is grasped by the attendant so that it can be readily shifted manually.

The agitator 11 comprises a pair of beaters 30 and 31 mounted respectively on suitable operating shafts 32 and 33. The beater 30, as shown, comprises a pair of rings 30a and 30b arranged at right angles to each other and connected rigidly to the lower end of the shaft 32; the beater 31 is provided with a pair of rings 31a and 31b similar to the rings 30a and 30b. The shafts 32 and 33 and their beaters 30 and 31 are so arranged that when the agitator is operated, the members 30 and 31 can be rotated in opposite directions so as to mesh one with the other. The beaters 30 and 31 at their lower ends are rotatably mounted on a suitable plate 34, while the upper ends of the operating shafts 32 and 33 are rotatably mounted in a similar plate 35. The plate 35 is rigidly secured to a supporting rod 36 which, as shown, is provided at its upper end with an abutment 37 on which the plate 35 rests and to which it is secured. The lower end of the rod 36 is curved outwardly as indicated at 38 to provide for the rotary motion of the rings 30 and 31, and the lower end of the curved portion is rigidly secured at 39 to the plate 34.

The rod 36 is arranged to be rigidly secured to the arm 14 and for this purpose the arm 14 is provided with a suitable housing 40 which, as will be pointed out in greater detail hereinafter, also functions to house suitable driving gear mechanism for the agitator. As shown, the upper end of the supporting rod 36 above the upper plate 35 is arranged to be received in a suitable aperture 41 provided for it in the lower wall of the housing 40. The end of the rod 36 received in the chamber 40 is provided with an annular groove 42 which is arranged to receive a latching

or locking plate 43 whereby the agitator is secured in its operative position.

The latching means for the rod 36 is shown in detail on an enlarged scale in Fig. 4. The plate 43, as shown, is mounted on the floor of the housing over the aperture 41 and is provided with a centrally arranged elongated slot 44 over the aperture 41. The plate 43 is arranged to have limited transverse and longitudinal movement in the housing 40. For this purpose, the plate, as shown, is provided with a pair of triangular shaped apertures 45 positioned on opposite ends of the aperture 44. These triangular apertures 45 receive suitable pins 46. These pins are rigidly mounted in the housing 40 between its bottom wall and a plate 47 elevated above the floor and resting on suitable ledges 48 provided for it in the housing. The pins 46 have a screw-threaded engagement with the bottom wall of the housing and may, as shown, be provided with heads 50 resting upon the plate 47 so as to rigidly secure it on its ledges 48.

One set of corresponding bases of the triangular apertures 45 are parallel with the longitudinal line of movement of the plate 43, while the apexes of the opposite angles are arranged to receive the rods 46. The apertures 45 and the rods 46 are so arranged that when the plate 43 is in its position shown in Figs. 1 and 4 the edge of the elongated aperture 44 will overhang the aperture 41 provided in the bottom wall of the housing. The plate 43 is biased in this direction or is biased to assume this position by means of a suitable spring 51 bearing against the left side of the plate 43 and the adjacent wall 52 of the housing.

It will be observed in view of the foregoing arrangement that when the upper end of the rod 36 is inserted in the aperture 41 provided for it, its upper end portion 36*a* above the recess 42 will engage the plate to shift it laterally until the groove 42 is brought into alignment with the plate, whereupon the plate will snap forward into the groove 42 so as to lock the rod 36 and the agitating tool in operative position, as shown in Fig. 1. Preferably, and as shown, the end portion 36*a* of the rod 36 will be tapered, as shown, to facilitate the application of the agitator.

To release the rod 36 and hence the agitator tool, it is merely necessary to move the plate 43 longitudinally within the housing, which operation will cause corresponding sides of the triangular apertures 45 to bear against the associated rods 46 with a cam action, whereby the plate will be retracted from the recess 42. This, of course, will release the rod 36 which can then be withdrawn. It will be observed that the plate 43 may be moved longitudinally in either direction to effect this relase of the rod 36. As shown, the inner end portion 43*a* of the plate 43 (Figs. 4 and 5) is directed through a suitable aperture or slot 53 in the side wall of the housing, while its other end 43*b* protrudes from the housing through a suitable slot 54 provided for it in the opposite side wall of the housing. In order to release the latching plate 43, it is merely necessary to depress either of these protruding end portions 43*a* or 43*b*, which operation, as previously pointed out, will cause the plate 43 to move so as to disengage the rod 36. It will be understood that the upper walls of the openings 53 and 54 provided for the respective end portions of the plate 43 will prevent vertical motion of the plate within the housing.

Mounted within the housing 40 are a pair of driving shafts 56 and 57 for the two shafts 32 and 33 respectively of the agitator 11. These shafts 56 and 57, as shown, are vertically arranged within the housing 40 which is provided with suitable bearings 58 and 60 for them at the lower and upper ends of the shafts respectively. The shafts, as shown, have mounted thereon suitable driving gears 56*a* and 57*a*.

The shafts 56 and 57 are of tubular form and are arranged to receive the shafts 32 and 33 in telescopic relation. In order to effect a mechanical driving connection between the agitator shafts 32 and 33 and their driving shafts 56 and 57; each driving shaft 56, 57 is provided at its lower end with a pair of diametrically opposed slots 61 arranged to receive a pair of similarly arranged teeth or projections 62 on the associated agitator shaft 32, 33 when the agitator is applied to the arm 14.

It will be observed that the teeth 62 provided on the agitator shafts 32 and 33 can be received by the slots 61 provided for them in the driving shafts 56 and 57 only when the associated agitator and driving shafts are in predetermined angular relations with each other. If the agitator is applied to the gear housing 40 with the shafts 32 and 33 in any other angular relation with respect to their driving shaft than these predetermined angular relations, it will be clear that the teeth 62 will not be received in their driving slots 61. In order that the agitator can be applied to and locked in operative position on the gear housing irrespective of the relative positions of the shafts, the shafts 56 and 57 are so arranged that they have limited vertical motion in the housing 40. By reason of this arrangement if either shaft 32, 33 is applied when in the wrong angular position its teeth 62 will engage the associated shaft 56, 57 and move it vertically. The shafts 56 and 57, however, are biased to return to their lower normal operative positions shown in Fig. 1 by means of suitable resilient means comprising a plate-like member 63 bearing on the gears 56*a* and 57*a* mounted on the driving shafts. The plate 63 is biased against these gears by means of a suitable compression spring 64 having its lower end bearing against the plate 63 and its upper end bearing against the upper wall of the housing 40, as clearly shown in Fig. 1.

It will be observed that by reason of this arrangement of the shafts 56 and 57, if when the agitator 11 is applied to the housing the shafts 32 and 33 are not in the correct angular relation with respect to their driving shafts 56 and 57, the driving shafts 56 and 57 will be moved upwardly in the housing against the force of the spring 64, and that when the driving shafts are subsequently rotated they will eventually move to the correct angular positions relative to the shafts 32 and 33 in which positions the teeth 62 will align with their slots 61, whereupon the driving shafts will be moved downwardly to their operative positions by means of the spring 64.

The gears 56*a* and 57*a* mounted on the shafts 56 and 57 respectively are operated by means of a suitable worm 66 (Figs. 1, 3, and 5) which is provided with oppositely wound threads 66*a* and 66*b* arranged when the worm is rotated to operate the driving shafts 56 and 57 and their respective connected shafts 32 and 33 in opposite directions.

The worm 66 is operated by means of a motor 67 mounted in the base of the frame and preferably in the hollow standard 13. As shown, the motor 67 is mounted in this standard and is supported at its lower end by means of suitable

screw fastening means 68. The motor is operatively connected with the worm 66 by means of a suitable flexible shaft 70. As shown, the flexible shaft 70 is threaded through the hollow standard 13 and the hollow arm 14, and is connected at its lower end with the motor shaft and at its upper end with the worm 66. It will be observed that by reason of this connection that when the motor 67 is energized to operate the shaft 70, the worm 66 will be rotated which in turn will rotate the agitator shafts 32 and 33 connected with it. It will be understood that the flexible shaft 70 may be formed of any suitable material, but preferably will be formed of steel.

It will be observed that by reason of the foregoing arrangement, the arm 14 together with the gear housing and the attached agitator 11 can be shifted so as to move the agitator out of the receptacle 10 and to return it to the receptacle 10 independently of the base 12 and the motor 67, that is, the agitator 11 may be shifted into and out of the bowl 10 without shifting the motor 67.

The motor 67 may be any suitable electric motor, thus, it may be either an alternating current motor or a direct current motor, or it may be a motor adapted to operate on either alternating current or direct current. The motor, as shown, is of the latter type and is energized from a suitable source of electrical supply 67*a* (Fig. 15). The motor is controlled by means of a suitable switch 71 mounted within the hollow standard 13 and provided with a controlling knob 72 accessible on the exterior of the standard. The details of construction of this switch form no part of the present invention and it has been deemed unnecessary to illustrate in detail the specific structure, as it will be understood that any suitable switch may be used to control the motor.

In Fig. 15, the control circuits for the motor 67 are shown diagrammatically. As shown in this figure, the switch 71 controls the energization of the motor field 67*b* so that in position 71*a* of the switch, the motor will operate on minimum field strength and thereby at the maximum speed; in the position 71*b* of the switch, the motor field strength will be increased somewhat so as to decrease the motor speed and in position 71*c*, in which position the arm is shown in solid lines in the drawings, the motor will be operating under maximum field strength and thereby at the slowest speed. The switch arm 71 is provided with a fourth position 71*d* which is an "off" position. In the particular device illustrated, it is contemplated that the motor will have a high speed of approximately 15800 R. P. M., an intermediate speed of approximately 13260 R. P. M. and a low speed of approximately 8710 R. P. M. It is to be understood, however, that the motor may be operated at any desired suitable speed.

In the particular device illustrated, the gearing interposed between the motor and the agitator is such that at the high speed of the motor, the beater tool shafts will operate at approximately 1160 R. P. M.; at the intermediate speed of the motor, the beater tool shafts will be operated at approximately 1020 R. P. M., while at the low speed of the motor, the beater tool shafts will be operated at about 670 R. P. M.

The receptacle 10 is mountd in an elevated position on the base 12 by means of a suitable pan-like supporting member 73 which in turn is rotatably mounted on the base 12. For this purpose, the base 12 is provided with a suitable socket 74 which receives a spindle 75 mounted in the central axis and on the bottom of the support 73.

It will be observed that the beater tool shafts 32 and 33 are arranged in the longitudinal center line of the base 12, and that the socket 74 and the bowl 10 are so arranged and so proportioned that when the agitator 11 is positioned within the bowl, as shown in Fig. 1, the rings 30*a* and 30*b* of the beater 30 will rotate closely adjacent the inner side wall of the receptacle 10, whereas the beater 31 will rotate more in the interior of the receptacle. By reason of the fact that the receptacle is rotatably mounted and the beater 30 rotates adjacent its inner side wall, the receptacle will be given a rotary motion on its spindle 75 by the action of the beater on the food material in the receptacle. The direction of rotation of the bowl 10 will depend upon the direction of rotation of the beaters 30 and 31. In the specific example given, the beater 30 rotates in a counterclockwise direction and so does the receptacle 10. By reason of the fact that the receptacle is thus rotated, the food material in all portions of the receptacle will be swept into the paths of motion of the beater tools and will be thoroughly mixed or whipped.

The mixing device is adapted to use a smaller receptacle than that shown in Fig. 1. For this purpose, the supporting member 73, as shown, is provided with a depressed central portion 73*a* of smaller diameter than that which is necessary for the bowl 10 so that the smaller bowl can be conveniently received by the supporting member, as shown in dotted lines in Fig. 1.

In order to accommodate the mixing device to this smaller bowl, a second socket 76 is provided in the base 12, placed in the central line of the base a distance from the socket 74 substantially equal to the difference in the radius of the two receptacles. It will be understood that by reason of this arrangement when the smaller receptacle is to be used, the supporting plate 73 will be shifted from its position in the socket 74 to its other position in the socket 76, in which position it is shown in dotted lines in Fig. 1. These sockets are so spaced that when the smaller receptacle is being used and the receptacle 73 has been placed in the socket 76, the beaters 30 and 31 will be positioned in the bowl adjacent its inner side wall as they are when the larger bowl is used, as shown in dotted lines in Fig. 1.

Under certain conditions of operation it may be that the action of the agitator 11 on the food in the receptacle will tend to rotate the receptacle at too high a speed, while under other conditions it may rotate the vessel at too low a speed, depending upon the consistency of the food within the receptacle; thus, the heavier the food mixture, the higher will be the speed imparted to the bowl by the action of the agitator; conversely, the lighter the food mixture, the lower will be the speed imparted to the bowl. At times, if a small amount of a food mixture of very heavy consistency is being worked, the vessel might be rotated by the agitator at such a high speed that the material would actually be thrown out of the bowl. On the other hand, the food mixture might be so light that the agitator would not rotate the bowl at all. Both of these conditions, of course, are undesirable.

Additional means are provided for controlling the rotation of the receptacle so that in the event it tends to rotate too fast, a retarding action will be imposed, whereas if it tends to rotate

at a slower speed than that desired, a driving force will be applied to it.

This additional controlling means comprises a friction wheel 80 rotatably mounted in the base 12 and protruding from the base so as to engage the under surface of the receptacle supporting pan 73 (Figs. 1 and 8). As shown, the friction wheel 80 is mounted upon a suitable lever arm 81 for rotary motion thereon, and is arranged to extend upwardly to engage the pan 73 through a suitable slot 81a provided for it in the floor of the base 12. The wheel 80 preferably will be formed of a suitable rubber composition.

The friction wheel 80 is in frictional engagement with a wheel 82 that is arranged to be operated by the motor 67. The wheel 82 is mounted on a shaft 83 that is rotatably supported at its ends in bearings 84 and 85 provided for it on the base 12. This shaft 83 is mechanically connected with the motor shaft through a gear and worm drive 86 so that when the motor is energized to operate the beater tools, the wheels 82 and 80 will be rotated at the same time. In the specific example illustrated, the gearing between the shaft 83 and the motor 67 is such that and the wheel 80 is so positioned in the base 12 that the smaller and larger bowls will be operated at selected speeds at the various motor speeds. For example, in the specific device illustrated, it is contemplated that the elements will be so arranged that when the large bowl 10 is being used it will be operated at a speed of 41 R. P. M. for the higher motor speed, a speed of 35 R. P. M. for the intermediate motor speed and a speed of 23 R. P. M. for the lowest motor speed. If the small bowl is being used and the pan 73 is positioned within the socket 76, the bowl will be operated at 69 R. P. M. at the higher motor speed, 60 R. P. M. at the intermediate motor speed and 41 R. P. M. at the lowest motor speed. It is to be understood that the device may, if desired, be arranged to rotate the bowl at speeds different from these values, and that these values are not to be interpreted in a limiting sense.

It will be observed in view of the fact that the wheel 80 protrudes above the floor of the base 12 that if the bowl 10 and pan 73 be removed and if a receptacle 86 (Figs. 9 and 10), such as a drink mixing receptacle, be placed on the base, the wheel 80 will engage the bottom of the receptacle and tend to rotate the receptacle off of the base. To overcome this difficulty, the wheel 80 is mounted on its lever 81 so that the wheel can be depressed when a receptacle is placed directly on the base 12, and at the same time that it is depressed, it will be disengaged from its driving wheel 82. The lever 81, as shown in Figs. 8 and 10, is mounted to rotate on the shaft 83; this lever preferably will be formed as an elongated U-member having its legs protruding through the aperture 81a and supporting the wheel 80, and having its nexus below the wheel 82. Within the legs of the U-member are suitable apertures or slots 87 in which the shaft 83 is received.

The lever 81 is biased in a counter-clockwise direction, as viewed in Figs. 8 and 10, so as to hold the wheel 80 in its normal operating position, as shown in these figures, by means of a tension spring 88 secured at one end to the lever 81 above its bearings 87 and at its other end to an anchor 89 on the base 12.

The wheel 80 is disengaged from its driving wheel 82 when depressed by means of a cam 90. The cam 90 is supported by the bearing member 85 in such a position relative to the roller 80 that when the roller is depressed, the cam will engage it to move it away from the wheel 82. To provide for this movement of the wheel 80 from its driving wheel 82, the bearings 87 in the lever 81 are formed as elongated slots, as clearly shown in Figs. 8 and 10. These slots 87 are provided with openings 91 so that the lever 81 can be readily removed from or assembled with the shaft 83.

One of the driving shafts 56, 57 is arranged to operate a citrous fruit juice extractor, meat grinder, buffer or the like, and like auxiliary devices commonly used in the household. As shown, in Fig. 1, the shaft 56 is arranged to drive these devices, and is shown in connection with a fruit juice extractor. This extractor comprises a juice bowl 92 arranged to rest on the gear housing 40, as shown in Figs. 1 and 3. Arranged to rotate substantially in the central vertical axis of the bowl is a fruit reamer 93. This reamer is provided with an operating shaft 94 which is arranged to have a driving connection with the tubular driving shaft 56. The shaft 94 at its lower end is provided with teeth 95 similar to the teeth 62 on the beater shafts 32 and 33. These teeth are arranged to be received in slots 95a provided for them in the upper end of the shaft 56, whereby a driving connection is established between the reamer and its driving shaft. A suitable bearing 96 for the lower end of the shaft 94 is provided in the upper wall of the gear housing 40. The bowl 92 is provided with a discharge nozzle or spout 97 (Fig. 3).

The bowl 92 may be conveniently used to feed or discharge a regulated quantity of oil or similar substance into a receptacle or bowl positioned on the base 12. Thus, the bowl 92 can be used to supply a regulated quantity of salad oil to the bowl 10 for making mayonnaise, etc. For this purpose a stopper 98 (Fig. 6) is arranged to be fitted into the lower end of the discharge nozzle 97. This stopper is fitted into the nozzle by dropping the stopper through the upper end of the nozzle. The nozzle and stopper, as shown, are tapered so that when the stopper is thus applied, it will not fall through the nozzle, but will be retained in the lower end of it.

Centrally arranged of the stopper is a conduit member or tube 100 passing completely through it and protruding some distance below the bottom of the stopper. This lower end of the tube supports a control valve 101 for the conduit. This valve 101 is shown in perspective in Fig. 7. In brief, it comprises a tapered closure portion 102 arranged to cooperate with the lower end of the tube 100 which constitutes a valve seat. The valve 102 is supported by a block-shaped supporting member 103. This block 103 in turn is supported by means of a collar 104 having a screw threaded connection 105 with the lower end of the tube 100. The collar 104 is provided with a circular ledge 106 at its lower end on which the ends of the block 103 rest. It will be observed that the position of the valve 102 relative to its seat can be varied by adjusting the position of the collar 104 on the lower end of the tube 100.

The nozzle 97, as shown, is arranged to discharge into the bowl supported on the base so that a regulated quantity of oil or other fluid can be discharged directly into the bowl. The beaters 30 and 31, of course, may be operated at the same time so as to mix the oil with the food material in the bowl.

If desired, a buffer, knife sharpener (neither of which is shown) or other similar device can

be operated by the upper end of the shaft 56, the buffer or other device having a shaft similar to the shaft 94 provided for the reamer arranged to fit in the bearing 96.

Also a suitable gear reduction assembly arranged to drive a meat grinder, or some similar device, may be operated from the upper end of the shaft 56. In Figs. 11 and 12 a gear assembly of this character is shown. This assembly, as shown, comprises a housing 107 in which a driving head 108 is supported to rotate on a horizontal axis in a suitable bearing 108a; this head 108 is rotatably mounted on a horizontal shaft 110. The head 108 is driven from the shaft 56 by means of a vertical shaft 111 and a suitable gear reduction mechanism. This mechanism comprises a bevel gear 112 mounted on the upper end of the shaft 111. The bevel gear 112 meshes with a bevel gear 113 mounted upon a sleeve 114 that is arranged to rotate freely on the shaft 110. The sleeve 114 carries a spur gear 115 which, as shown in Fig. 12, meshes with a spur gear 116 of relatively large diameter. The gear 116 is mounted to rotate upon a shaft 117 upon which is also mounted a spur gear 118 of relatively small diameter arranged to rotate with the shaft. The shaft 117 is supported in a horizontal position parallel with the shaft 110 by suitable bearings positioned at the ends of the shaft 117. The gear 118 drives a somewhat larger gear 120 which is mounted to rotate upon a shaft 121 also arranged parallel with the shaft 117 and supported in suitable bearings provided for it in the housing. The shaft 121 drives a gear 122 which meshes with a gear 123. This gear 123 is connected to rotate the driving head 108; the gear 123, as shown in Fig. 11, has a threaded connection 124 with the driving head.

The shaft 111 at its lower end is provided with teeth 125 arranged to be received in the slots 95 arranged at the upper end of the shaft 56 so as to establish a driving connection between this shaft 56 and the reduction mechanism.

The face of the driving head 108 is provided with a diametral tooth 126. This tooth is arranged to be received in a slot 127 provided for it in the shaft 128 of a device which is to be driven by the gear reduction mechanism.

The device shown in Fig. 11 driven by this mechanism is a meat grinder, but it will be understood that other appliances can be driven by my apparatus through the gear assembly.

The meat grinder, as shown, comprises a feeding or forcing screw 130 which is driven by the shaft 128, and a hopper 131 through which the meat or other edible is supplied to the feed screw. The driving shaft 128 is mounted in a bearing 132 provided for it in the housing of the grinder. The bearing 132 is arranged to be received in an aperture 132a provided for it in the housing 107, and which communicates with the driving head 108. Preferably, the bearing 132 will be tapered somewhat and the apertures 132a will be tapered in a similar manner so as to provide a rather snug fit for the bearing. The bearing and hence, the meat grinder to which it is attached are locked in operative position on the gear housing by means of a suitable locking pin 134 which is received in an aperture 135 provided for it in the bearing 132. The pin 134 is biased to its locking position by means of a compression spring 129; to release the grinder it is merely necessary to retract the pin from its aperture 135 against the force of the spring and then withdraw the grinder as a unit from its socket 132a.

The driving head 108 is mounted for limited longitudinal movement on the shaft 110 so that in the event the meat grinder is applied to the gear housing when the tooth 126 does not align with the slot 127, the head 108 when it is engaged by the shaft 128 will be merely moved backwardly into the gear housing on the shaft 110. The driving head 108, however, is biased to its normal operationg position, shown in Fig. 11, by means of a compression spring 138, so that if the grinder is applied when the driving tooth 126 does not align with the slot 127, then when the apparatus is subsequently operated and the head 108 eventually is driven to such a position that the tooth 126 will align itself with its slot 127, the spring 138 will force the driving head toward the right and into its normal operating position.

The position of the gear housing is stabilized in its operative position on the arm 14 by means of a suitable rod 140 which is secured at its upper end to the gear housing 107 and which extends downwardly to the base 12 where it is received in the socket 74; as shown, the lower end portion of the rod is provided with a tapered portion 141 which is received in the socket 74. To further stabilize the gear housing, a pair of screws 142 are provided on opposite sides of the housing to engage the adjacent side edges of the top of the gear housing 40 so as to prevent lateral movement of the reduction gear mechanism.

It will be observed in view of the foregoing description that the gear reduction mechanism is formed as a unitary structure which may be readily applied to the mixing apparatus to be driven thereby, and which may be readily removed from the apparatus.

As previously indicated, it is contemplated that the mixing apparatus may be conveniently used to mix drinks and the like. For this purpose, a special drink mixing tool is provided. This tool, as shown in Figs. 9 and 10, comprises a driving shaft 144. This shaft at its upper end is arranged to rotate in a suitable plate 145. This plate is arranged to be locked to the mixing apparatus in a manner similar to that in which the plate 35 for the tool shafts 32 and 33 is locked to the apparatus. For this purpose, a locking knob 146 is secured to the plate 145. This knob 146 at its upper end is provided with a recess 147 which is arranged to be engaged by the locking plate 44 to lock the mixing tool in its operative position. The upper end of the mixing tool is provided with driving teeth 148 arranged to be received in the slots 61 provided in the driving shaft 56. The lower end of the shaft 144 carries a pair of agitator elements 150 spaced vertically on the shaft, as clearly shown in Figs. 9 and 10. Each of these agitator elements comprises a corrugated disc, the corrugations extending radially of the disc. The reason for providing two agitator discs 150 is that the lower one will function to mix the heavy particles which sink in the liquid, while the upper agitator will mix the material which floats or tends to float at the top of the liquid. The mixing device arranged in accordance with this invention may also be conveniently used for mixing cold desserts, ice cream and the like which are made in the mechanical refrigerator commonly used in households.

My apparatus may be used conveniently to mix cold desserts and the like which are contained in a refrigerator pan or dish. Referring to Figs. 13 and 14, a refrigerator dish 151 is shown mounted upon a suitable pan support 152 which in turn

is positioned on the base 12. The support 152 is secured to the base 12 by means of a pair of spaced studs 153 provided on the bottom wall of the support and arranged to be received in the sockets 74 and 76 in the base 12. The rear of the pan 152 is provided with an upwardly extending flange 154 which acts as a guide for the receptacle 151. The front edge of the pan 152 preferably will be provided with a downwardly extending flange 155. In using the apparatus to mix food material in the receptacle 151, it is contemplated that the receptacle will be moved laterally on its supporting pan 152 so as to bring all portions of the edible in the receptacle into the path of the beater tools 30 and 31. The rear flange 154 serves to guide the receptacle 151 when it is thus moved laterally.

It will be observed in view of the foregoing description that the mixing device arranged in accordance with this invention may be used for a variety of purposes. The device, as pointed out previously, has three operating speeds so that the best mixing actions can be had for the different edibles to be mixed or beaten. Thus, for example, the high speed is especially adapted for a heavy mixture such as fudge, ice box cookies, etc.; eggs when they are to be used as part of a leavening agent; cake icing, etc.; creaming sugar, shortening and eggs for cakes. Moreover, it is contemplated that the high speed will be used to drive the juice extractor, drink mixer, the food chopper through the reduction mechanism, grater or knife sharpener, etc. The medium speed is particularly adapted for beating cakes after adding flour and milk; whipping cream; beating mayonnaise; mashing vegetables, and the like. While the low speed is preferable for chopping shortening and flour together in making biscuits, pastry, etc.; folding sugar into egg whites for cakes or meringue; folding egg whites into cakes or puddings; mashing small quantities of vegetables, etc.

The beating tools 32 and 33 and also the mixing tool 144 may be conveniently applied by moving the arm 14 on its pivot back to its retracted position, and then applying the tool, after which the arm can be returned to its normal operating position shown in Fig. 1.

When it is desired to use the juice extractor it is preferable to remove the beating tools 30 and 31 or the drink mixing tool from the apparatus, and then place the extractor bowl in position on top of the gear head 40. Then the reamer 93 should be placed in its bearing 96 so that a driving connection is effected with the shaft 56. Then a glass or mixing cup or some other suitable vessel or receptacle can be placed on the base of the mixer directly under the spout 97 so as to collect the juice which is extracted from the fruit.

As previously indicated, the device also may be used to drop a regulated quantity of oil into a bowl, while it is being used to mix salad dressings, etc. For this purpose, as previously indicated, the stopper 98 is dropped into the spout 97 and the collar 104 is adjusted so as to secure the desired flow of oil.

The gear reduction mechanism shown in Figs. 11 and 12, as previously pointed out, is used to drive such devices as meat grinders and the like. In order to apply the gear mechanism, it is merely necessary to fit the reduction unit support rod 140 into the aperture 74 provided in the base, while at the same time centering the driving shaft 111 into the upper end of the driving shaft 56. The attendant should be careful that the two studs 142 be positioned on opposite sides of the gear housing 40.

Moreover, suitable knife sharpeners, graters, etc. may be driven from the shaft 56, as is the juice extractor reamer 94.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I, therefore, contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A mixing device and the like comprising a base, a rigid hollow standard on said base, means supporting a receptacle on said base, a driving motor on said base within said hollow standard, a rigid hollow arm mounted on said standard, a gear housing carried by said arm, an agitator driving shaft mounted in said housing, an agitator supported by said housing in operative position in said receptacle, a driving connection between said shaft and said agitator, a single flexible shaft in said rigid hollow standard and said rigid arm connecting said motor with said housing, gearing in said housing between said flexible shaft and said agitator shaft, a pivotal connection between said rigid hollow arm and said rigid standard so that said arm and said housing can be shifted to move said agitator from its operative position in said receptacle and to return it to said operative position without displacing said base and said motor, said flexible shaft permitting said shifting movement of said arm and housing, and latching means detachably connecting said agitator to said housing.

2. A mixing device comprising a frame provided with a base portion and a rigid hollow standard adjacent one end of said base portion extending upwardly therefrom, a rigid hollow arm pivotally attached to the upper end of said standard arranged in one position to overlie said base and to be swung on said standard to a position remote therefrom, a plunger on said standard arranged to engage said arm in each of said positions to hold it in said position, resilient means biasing said plunger into engagement with said arm, means for supporting a mixing receptacle on said base below said arm when the latter is in said one position over said base, an agitator supported by said arm so that when it is in said one position said agitator is positioned in said receptacle and when said arm is swung to said remote position said agitator is moved out of said receptacle, an electric driving motor mounted within the lower end of said rigid hollow standard, means securing said motor to said frame, a single flexible driving shaft extending upwardly from said motor through said rigid hollow standard and said rigid arm, means mechanically connecting said shaft at its lower end to said motor and at its upper end to said agitator so as to effect a driving connection between said motor and said agitator and a controlling switch for said motor within said hollow standard provided with a control handle accessible on the exterior of said standard.

3. A mixing device and the like comprising an agitator, a support for said agitator, a latching member on said support movable in one direction so that it can be advanced to engage said agitator to lock it in an operative position in said support and means on said support engaging said latching member when it is moved in another di-

rection approximately at right angles to said one direction so as to retract it from engagement with said agitator to release it.

4. A mixing device and the like comprising a base, a supporting member on said base, an agitator and means detachably mounting said agitator in said supporting member comprising a member on said agitator having a groove therein, a latching member on said supporting member having limited lateral and longitudinal movement on said member and arranged when moved laterally in one direction to enter said groove so as to lock said agitator, resilient means biasing said latching member to its latching position in said groove and cam means associated with said latching member so as to withdraw it from said groove when said latching member is moved longitudinally on said supporting member.

5. A mixing device and the like comprising an agitator, a housing, a supporting member for said agitator having a portion with a groove therein, said housing being provided with an aperture for receiving said portion with the groove in it, a latching plate in said housing movable laterally into locking position in said groove and having a portion protruding from said housing, a resilient member in said housing biasing said plate to its locking position so that when said supporting member is inserted in said aperture, said plate automatically moves into said groove to lock said agitator, a plurality of pins in said housing and said plate having apertures receiving said pins, each aperture provided with an inclined surface engaging each pin and so arranged that when said protruding portion of said plate is depressed, said plate is moved out of said groove so as to release said support.

6. A mixing device and the like comprising an agitator, a support for said agitator having an aperture and said agitator having a rod-like portion arranged to be inserted in said aperture, a latching plate on said support, a pair of pins on said support on opposite sides of said aperture, said plate having a pair of triangular shaped apertures receiving said pins and providing limited movement of said plate laterally and longitudinally of said support, said triangular apertures being arranged with one pair of corresponding bases parallel with the longitudinal line of movement of said plate, a spring biasing said plate laterally in one direction so that said pins normally rest in the apexes of said apertures opposite said bases in which position said plate has an edge projecting over said aperture, but when said plate is moved longitudinally the adjacent sides of said triangular apertures engage said pins to move said plate laterally away from said aperture, the portion of said rod-like member insertable in said aperture being provided with a groove in which said projecting portion of said plate is received when said portion is inserted in said aperture.

7. A mixing device and the like comprising a detachable agitator, a driving shaft for said agitator, means for establishing a driving connection between said driving shaft and said agitator when said members are in a predetermined angular relation and by a relative longitudinal movement between said members of predetermined distance, means providing for longitudinal movement of said driving shaft from its normal operative position by said agitator by an amount at least equal to said predetermined distance when said agitator is applied in any other than said predetermined angular relation, means biasing said shaft to return it to its normal position so that when it is subsequently operated to said predetermined angular relation with said agitator, said shaft returns to its normal operative position to establish said driving connection, and means for operating said driving shaft continuously irrespective of its position within its range of longitudinal movement so that said shaft when removed from its normal operative position when said agitator and shaft are not in said predetermined angular relation can be driven into said angular relation by said operating means.

8. A mixing device and the like comprising a supporting frame, a detachable agitator having an operating shaft, a supporting rod for said shaft, means for locking said rod to said frame to support said shaft in an operating position, a driving shaft for said agitator mounted in said frame and having a telescopic relation with said agitator operating shaft, means for establishing a driving connection between said shafts when moved together telescopically a predetermined distance and in a predetermined angular relation, means yieldingly holding said driving shaft in its operative position so as to provide for movement of said shaft from said position a distance at least as great as said predetermined distance in the event said agitator is applied to said frame and its supporting rod is locked therein with said operating shaft in any other than said one angular relation and to return said driving shaft to said operative position when it has been rotated subsequently to said one angular relation so as to establish said driving connection, means for rotating said driving shaft and means establishing a driving connection between said driving shaft and said rotating means arranged to maintain said driving connection between said members while said shaft is moved from and returned to its operative position.

9. A mixing device comprising a base, a gear housing mounted on said base, a detachable agitator arranged to be applied to said gear housing, a tubular driving shaft for said agitator in said gear housing, said agitator having a shaft arranged to slide into said tubular shaft a predetermined distance when the shafts are in a predetermined angular relation and to fit non-rotatably therein, a gear rigidly secured to said tubular shaft, a driving gear meshing with said gear, a motor for operating said driving gear, means mounting said tubular shaft for longitudinal movement in said housing from its normal operative position a distance at least as great as said predetermined distance, said gears arranged to maintain a driving connection between said shaft and motor while said shaft is moved from its normal operative position said predetermined distance and returned to said normal operative position, and resilient means biasing said shaft to said normal position so that in the event said agitator shaft is applied to said tubular shaft in any position other than said predetermined angular relation, said shaft is moved from its normal operative position by said agitator by an amount equal to said predetermined distance and is returned thereto by said resilient means when the tubular shaft is subsequently operated by said motor to move into said predetermined angular relation with said agitator shaft.

10. A mixing device and the like comprising a base, a gear housing mounted on said base, a pair of parallel tubular shafts mounted in said gear housing, each of said shafts having a gear

mounted thereon, a driving gear connected with said first named gears, means for operating said driving gear whereby said shafts are operated, an agitator comprising a pair of agitating tool operating shafts arranged to be received into said tubular shafts and a rod-like supporting member arranged to be applied to said gear housing, means for locking said rod-like supporting member to said gear housing with said agitator shafts in operative position, driving connections between said tubular shafts and said agitator shafts, each comprising a slot in the associated tubular shaft and a pin carried by the agitator shaft arranged to fit in said slot when said shafts are in a predetermined angular relation, means providing for relative longitudinal movement of said tubular shafts in said gear housing so that in the event said agitator snafts are applied to said housing and locked to it with said agitator shafts in any other than said predetermined angular relation, said tubular shafts will be moved in said housing from their normal operative positions, and resilient means biasing said tubular shafts to their normal operative positions so as to return them to said positions subsequently by the operation of said operating means when said predetermined angular relation has been established with said agitator shafts.

11. A mixing device and the like comprising a receptacle, means supporting said receptacle for rotary motion, an agitator in said receptacle arranged to cause said receptacle to rotate in accordance with the consistency of the food material in said receptacle by acting on the food material in said receptacle, and means for driving said receptacle under certain conditions of operation and for retarding the motion of said receptacle by said agitator under other conditions of operation depending upon the consistency of the food material in said receptacle, comprising a friction wheel, a second friction wheel engaging said first friction wheel, means for driving said second friction wheel, resilient means biasing said first friction wheel to an operative position where it engages said receptacle and said second friction wheel so as to effect a driving connection between said driving means and said receptacle, and cam means for disengaging said first friction wheel from said second friction wheel against the force of said biasing means when said first friction wheel is moved away from said operative position.

12. A mixing device and the like comprising a receptacle, means supporting said receptacle for rotary motion, an agitator in said receptacle arranged to cause said receptacle to rotate by acting on the food material placed within it, a motor for operating said agitator, and an operable connection between said motor and said receptacle comprising a friction wheel, a second friction wheel, a driving shaft supporting said second friction wheel, a U-shaped bracket rotatably supporting said first fricion wheel mounted on said shaft for rotary and sliding movement with reference to said shaft, a spring connected with said bracket to move it on said shaft so as to bring said first friction wheel into engagement with said second friction wheel and to an operative position where it engages said receptacle, a cam for engaging said first friction wheel when it is moved from said operative position so as to move said wheel away from said second friction wheel, said bracket sliding on said shaft to provide for movement of said first friction wheel from said second friction wheel, and means for operating said driving shaft.

13. A mixing device and the like comprising a receptacle, means supporting said receptacle for rotary motion, an agitator in said receptacle arranged to cause said receptacle to rotate by acting on the food material placed within it, a motor for operating said agitator, a member positively driven by said motor, and a second member frictionally engaging said first member to be driven thereby, and also frictionally engaging said receptacle so as to assist said agitator in driving said receptacle under certain conditions of operation and to retard the motion of said receptacle by said agitator under other conditions of operation depending upon the consistency of the food material in said receptacle.

14. A mixing device and the like comprising a receptacle, means supporting said receptacle for rotary motion, an agitator in said receptacle arranged to cause said receptacle to rotate by acting on the food material placed within it, a friction wheel engaging said receptacle and means controlling said friction wheel to drive said receptacle or to retard its motion depending upon the consistency of the food material in said receptacle.

15. A mixing device and the like comprising a base, a receptacle, means supporting said receptacle on said base in an elevated position and for rotary motion, an agitator arranged to operate in said receptacle to rotate said receptacle by acting on the food material in it, a motor for driving said agitator, a friction wheel having a driving connection with said receptacle, a driving connection between said motor and said friction wheel so that the wheel is driven by said motor when the latter is operating said agitator, means movably supporting said friction wheel for movement away from said receptacle, resilient means biasing it into engagement with said receptacle, and means for disconnecting said wheel from said motor when said wheel is depressed so that in the event a receptacle other than said rotary receptacle is placed on said base, said wheel is depressed to thereby prevent rotation of said receptacle by said wheel.

16. A mixing device and the like comprising a base, a receptacle, means supporting said receptacle on said base in an elevated position and for rotary motion, an agitator arranged to operate in said receptacle and to rotate it by acting on the food material placed within it, a motor for driving said agitator, a friction wheel on said base beneath said receptacle and having a friction driving connection with it, a driving connection between said motor and said friction wheel, means mounting said friction wheel for a downward movement from said receptacle, and means for disconnecting said wheel from said motor when said friction wheel is depressed.

17. A mixing device and the like comprising a base, a receptacle, means supporting said receptacle on said base in an elevated position and for rotary motion, an agitator arranged to operate in said receptacle, a motor for driving said agitator, a driving member on said base beneath said receptacle, a driving connection between said member and said receptacle, a driving connection between said driving motor and said driving member, means for mounting said driving member for a downward movement relative to said base so that in the event a receptacle is placed directly on said base, said member is moved downwardly by said receptacle, and means for disconnecting said driving member from said motor when said driving member is depressed.

18. A mixing device and the like comprising a frame, an agitator carried by said frame arranged to rotate in a food preparation receptacle, a plurality of spaced sockets in said frame for rotatably receiving receptacles of different widths so that they are carried on said frame in proper position with relation to said agitator, a friction wheel in said frame arranged to engage each food receptacle when positioned within its socket so as to effect a driving connection with it, said friction wheel being positioned relative to said sockets so that it will engage a relatively large receptacle a greater distance radially from its axis of rotation than it will a smaller receptacle and means for driving said friction wheel.

19. A mixing device comprising a frame having a base portion and an arm for supporting an agitator, a vertically arranged shaft on said arm, means for establishing a driving connection between the lower end portion of said shaft and said agitator, a motor in said frame for driving said shaft, a detachable unitary gear reduction mechanism arranged to be supported on said arm and to have a driving connection with the upper end portions of said shaft, and means on said mechanism arranged to engage a portion of said base so as to stabilize said mechanism on said arm.

20. A mixing device and the like comprising a detachable implement having an operating shaft, a driving shaft for said operating shaft, means for establishing a driving connection between said driving shaft and said operating shaft when said members are in a predetermined angular relation and by relative longitudinal movement between said members of predetermined distance, means providing for longitudinal movement of said driving shaft from its normal operative position by said operating shaft by an amount at least equal to said predetermined distance when said operating shaft is applied in any other than said predetermined angular relation, means biasing said driving shaft to return it to its normal position so that when it is subsequently operated to said predetermined angular relation with said operating shaft, said driving shaft returns automatically to its normal operative position to establish said driving connection, and means for operating said driving shaft continuously irrespective of its position within its range of longitudinal movement so that said driving shaft when removed from its normal operative position by said operating shaft when said operating shaft and said driving shaft are not in said predetermined angular relation can be driven into said angular relation by said operating means.

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