June 4, 1935. A. C. GILBERT 2,003,931

MIXING APPARATUS

Filed Oct. 9, 1933

Fig.1.

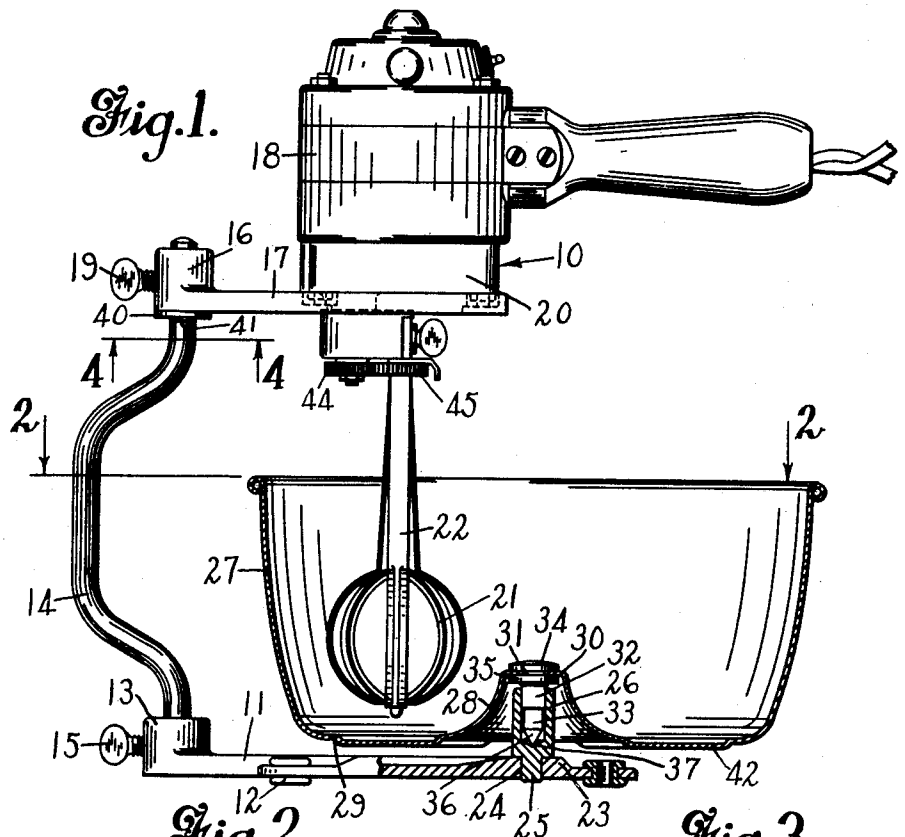
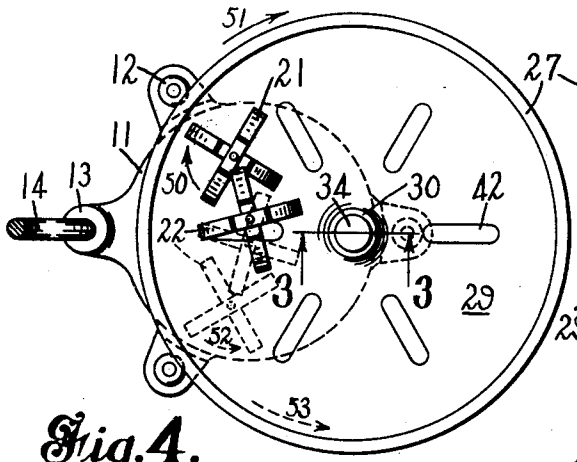


Fig.2.

Fig.3.



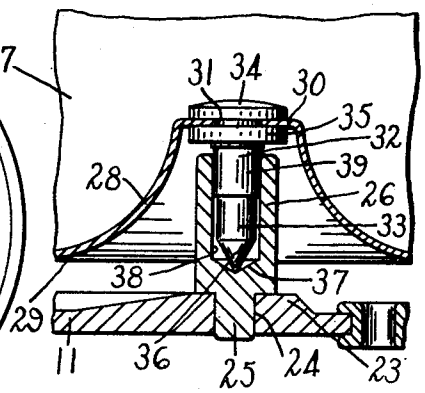
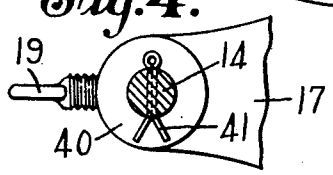


Fig.4.



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2,003,931

MIXING APPARATUS

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Application October 9, 1933, Serial No. 692,745

4 Claims. (Cl. 259—84)

This invention relates to a mixing apparatus and more especially to an apparatus for churning, beating or otherwise mixing materials of a semi-plastic nature, such as cake batters, frostings, candies, cream, etc.

In my prior patent for mixing apparatus, No. 1,781,381 of November 11, 1930, I have disclosed and claimed a portable type of mixing apparatus adapted for churning, beating or otherwise mixing materials of a plastic state. The machine described in my prior patent includes a base on which a container for the material may rest during the mixing process, an upright supported on the base and in turn forming a support for a pair of horizontal arms on which a vertical motor rests. Extending downwardly from the motor and adapted to enter the container is a beating or whipping device driven by the motor. The apparatus of the present invention takes a somewhat similar form but differs therefrom in that provision is made for bringing the beating element or elements into more intimate contact with all portions of the material being mixed, and in that provision is made for rotating the container in either direction and at various speeds as the requirements of mixing demand.

One of the objects of the present invention is to provide a form of mixing apparatus in which a relatively large amount of semi-plastic material may be properly and thoroughly mixed or beaten.

A further object of the invention is to provide a mixing apparatus in which a relative movement between the mixing or beating element and the container for the material is produced to insure an intimate contact of the beating element with all parts of the material.

In a more specific aspect it is an object of the invention to provide a mixing apparatus in which a rotatable container for the material may be rotated in either direction and at various speeds in an inexpensive and efficient manner, and as desired or required by the material being mixed or beaten.

A feature of the invention resides in a form of apparatus in which the mixing element comprising oppositely rotatable members and the container are adjustable with respect to each other so that various relative movements may be produced by the action of the mixing element or elements on the material between the element and the container and without the necessity of providing additional mechanical means for producing such motion.

To these and other ends, the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawing:

Fig. 1 is a front elevational view, partly in section, of a mixing apparatus according to my invention;

Fig. 2 is a cross-sectional view along line 2—2 of Fig. 1, but on a reduced scale;

Fig. 3 is a cross-sectional view, taken along line 3—3 of Fig. 2, but on an enlarged scale, and

Fig. 4 is a cross-sectional view along line 4—4 of Fig. 1, but on an enlarged scale.

Referring then to the drawing in which I have illustrated my invention by showing a preferred embodiment of the same, the reference numeral 10 indicates in general the improved mixing apparatus which to a certain extent takes the form of that disclosed in my prior patent and includes a base 11, provided with feet 12, and a boss 13 formed near the edge of the base, a rod 14 being mounted in boss 13 and secured against movement therein by a thumb screw 15. The upper end of rod 14 extends through a boss 16 on horizontal motor support 17, an electric motor 18 resting on the upper surface thereof, the boss 16 having a threaded opening in which a thumb screw 19 is mounted and adapted to bear against rod 14 to hold the support 17 against movement.

On the lower end of motor 18 is a reduction gearing 20, herein not shown in detail, from which extends a motor driven gear 44 which, by cooperation with a pair of gears 45, one secured to each of beaters 21 and 22, drives the latter in opposite directions. The beaters 21 and 22 extend downwardly in the direction of base 11. The apparatus described up to this point is substantially identical with that disclosed in my prior patent which may be referred to for a more complete description thereof. Herein I shall confine myself to those features which distinguish my present invention from that of my prior patent.

Formed on base 11 diametrically opposite boss 13 is a boss 23 having a vertical opening 24 in which a stem 25 of hollow stud 26 is received, stem 25 being freely removable from opening 24. The reference numeral 27 indicates a mixing bowl herein formed of metal and having an inwardly dished conical part 28 formed centrally of the bottom or base 29 thereof, the flat upper end 30 of the cone being bored at 31 for the reception of stem 32 of vertical stud 33. On the upper end of stud 33 is a head 34 engaging the upper face of the flat upper end 30 of cone 28, a washer 35 being driven or otherwise secured on stem 32 and

cooperating with head 34 to grip the bowl 27 therebetween.

The stem 32 is provided at its lower end with a conical point 36 which rests in the countersunk bottom 37 of axially directed openings 38 of stud 26, and near its upper end the stem 32 is provided with a bearing surface 39 of proper diameter to permit the free rotation of the stem 32 in opening 38.

Near the upper end of rod 14 is a washer 40 supported on a pin 41, in this instance a cotter pin, the washer 40 serving to support the member 17 when the thumb screw 19 is loosened, the position of washer 40 on rod 14 being such that the beating or mixing elements 21 and 22 are carried at a proper distance above the base 29 of bowl 27.

In carrying out the features and objects of this invention it is preferable that the bowl or container 27 be circular in form and of a diameter considerably larger than the diameter of the circle described by either of the elements 21 or 22 when they are rotated, so that the arcuate adjustment of these elements in respect to the bowl will be of sufficient extent to permit a comparatively wide variation in the action of the elements on the material, and through it a desirable variation of the rotational speed of the bowl. Arcuate adjustments of the elements 21 and 22 about the rod 14 may readily be made to dispose the elements 21 and 22 so that either of them will be closely adjacent the wall of the bowl, or both of them equally spaced therefrom. Intermediate position between the last position referred to and the extreme positions adjacent the bowl wall are permitted for the elements 21 and 22, and when made, vary the action of the elements on the material and on the rotational speed of the bowl.

When the elements 21 and 22 are in the position as shown in full lines in Fig. 2, and the element 21 is rotating in the direction indicated by arrow 50, its action upon the material in the bowl is such as to rotate the bowl about its pivot in a direction indicated by arrow 51 and at a maximum speed of rotation somewhat dependent upon the constituency of the material being mixed. The rotation of the bowl is caused by the blades of element 21 acting in cooperation with the material adjacent the bowl wall and which tends to adhere thereto. This action is somewhat similar to the meshing of the teeth of two cooperating gears. Differentiating from actual gear action, however, and due partly to the constituency of the material being mixed, the difference in diameter between the element and the bowl at its wall produces, when element 21 is disposed farther from the wall, a slower speed of bowl rotation, the effect of the rotation in an opposite direction of element 22 in the material also acting to partly slow up the rotation of the bowl.

When the element 22 which rotates in an opposite direction than that of element 21, as indicated by dotted arrow 52, is disposed closer to the bowl wall, as indicated in dotted lines in Fig. 2, the bowl will be rotated in the direction indicated by dotted arrow 53. It is obvious, therefore, that the novel structural combination disclosed above is adapted for use to thoroughly mix or beat the material in the bowl while rotating the bowl in either direction and at variable speeds, and to so mix or beat the material without causing rotation of the bowl, and that these mixing actions may be produced without the intervention of any mechanical means or devices. The rotary motion given the bowl as above described, brings fresh portions of the material into contact with the beating elements 21 and 22, thus providing for a thorough mixing of all parts of the material.

If desired, the bowl 27 and stud 26 may be readily detached from the base 11, whereupon the mixing apparatus may be used with containers of various other forms. The stem 32 is carried entirely within the conical dished out part 28 so that the bowl may rest on its base when removed from the mixing apparatus without interference from the stem in the particular instance shown, the bottom 29 of the bowl being provided with a plurality of radially directed ribs 42 on which it rests when removed from base 11.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. In a mixing apparatus, a base, a bowl mounted on said base for free rotation thereon, a stirring device comprising a pair of oppositely rotatable elements, means to support said stirring device, and means to adjust said supporting means in a horizontal plane to dispose said stirring device with one of the elements thereof closer to the wall of said bowl than the other element to cause rotation of said bowl in one direction during the beating operation, and to adjust said supporting means to dispose the other element in like position in respect to the bowl wall to cause rotation of the bowl in the other direction.

2. In a mixing apparatus, a base, a bowl mounted on said base for free rotation thereon, a stirring device comprising a pair of oppositely rotatable elements, means to support said stirring device, and means to adjust said supporting means to dispose said stirring device with one of the elements thereof closer to the wall of said bowl than the other element to cause rotation of said bowl in one direction during the beating operation, and to adjust said supporting means to dispose the other element in like position in respect to the bowl wall to cause rotation of the bowl in the other direction, and to adjust said supporting means to disposed both of the elements equally spaced from the wall of the bowl to prevent rotation thereof in either direction.

3. In a mixing apparatus, a base, a bowl, a mounting for said bowl on said base providing for the free rotation of the bowl on the base, an upright member extending upwardly from the base at a point laterally of the bowl, a stirring element depending into the bowl in a region between said upright member and the axis of rotation of the bowl, said stirring element being motor driven and comprising oppositely rotating beaters, and means for mounting said stirring element on said upright member so that said element can be swung in a horizontal arcuate path from a central position in which it is alined with the bowl axis and upright member to a position adjacent the wall of the bowl at one side thereof for rotating the bowl in one direction through the action of the beaters on material in the bowl or to a position adjacent the wall of the bowl at the opposite side thereof for producing rotation of the bowl in the opposite direction.

4. In a mixing apparatus, a base, a bowl supported on said base for free rotation thereon, an upright member extending from the base in a location at one side of the bowl, a pair of duplex

beaters having overlapping paths of rotation and oppositely driven depending into said bowl in a region between said upright member and the axis of rotation of the bowl, and means for mounting said beaters from the upper part of said upright member comprising a bracket member overhanging the bowl, said bracket member being adjustable relatively to said upright member so as to swing said beaters in a horizontal arcuate path to bring one or the other thereof into proximity to the bowl wall at one or the other side of the bowl to effect rotation of the bowl in opposite directions as desired.

ALFRED C. GILBERT.