Nov. 11, 1930. A. C. GILBERT 1,781,381

MIXING APPARATUS

Filed Feb. 20, 1929 2 Sheets-Sheet 1

Fig. 1.

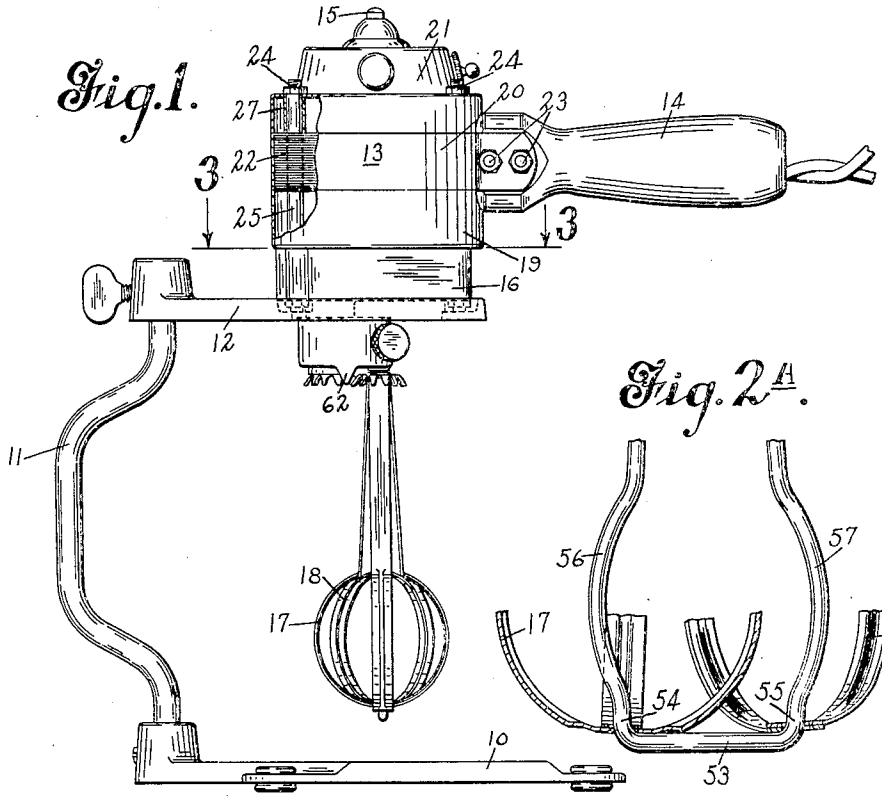


Fig. 2A.

Fig. 2.

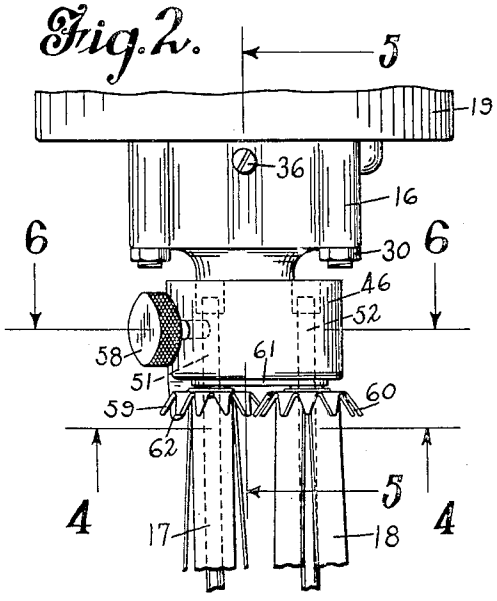
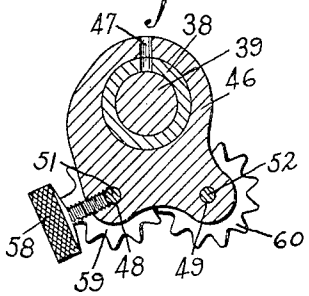


Fig. 6.



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MIXING APPARATUS

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Fig. 3.

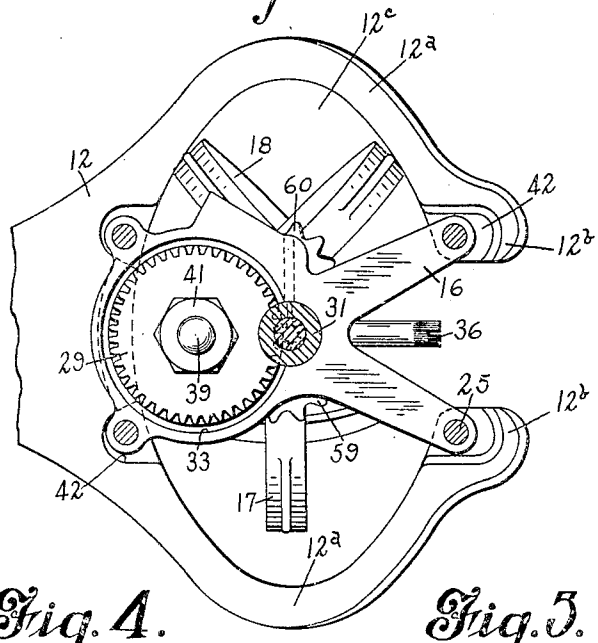


Fig. 4.

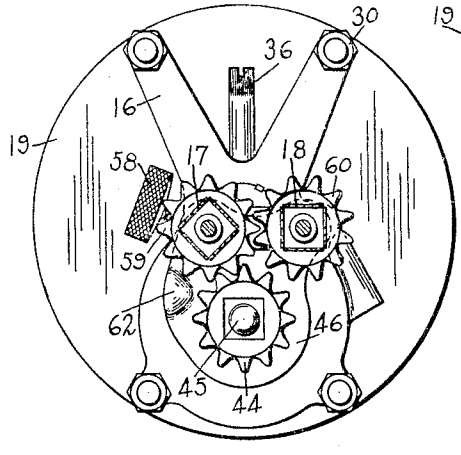
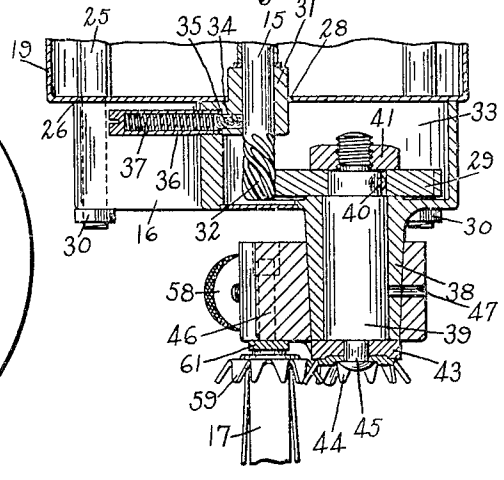


Fig. 5.



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UNITED STATES PATENT OFFICE

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MIXING APPARATUS

Application filed February 20, 1929. Serial No. 341,411.

This invention relates to apparatus for churning, beating, or otherwise mixing materials of a semi-plastic nature, and which is adaptable especially for use in mixing or beating cake batter, frosting, candy, cream, etc.

More particularly this invention relates to improvements in apparatus of this type, which are portable and are driven by an electric motor.

One object of this invention is to provide an improved, inexpensive, efficient and portable electrically operable beating or mixing apparatus which may be used by being held in the hand or supported upon a suitable receptacle holding standard or the like.

Another object of this invention is to provide a mixing device which is readily disassembled for inspection or repair and as readily assembled for use.

Still another object of this invention is to provide an improved motor and gearing structure for use in such apparatus, whereby these parts may be enclosed to prevent the material being mixed, coming into contact therewith, and which will permit the proper lubrication thereof.

A further object of this invention is to provide for use in such apparatus an improved gear box and motor bearing member, which is also adapted for use as a support for the device to retain it in position upon a receptacle holding standard, or the like.

A still further object of this invention is to provide for use in such apparatus, an improved beating element which is adapted to be readily detached from the driving mechanism to facilitate its cleaning, and as readily attached thereto for use.

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 drawings:

Fig. 1 is a side view of a form of mixing apparatus, embodying the features of this invention;

Fig. 2 is an enlarged front view of parts of this apparatus;

Fig. 2A is a continuation of the part shown in Fig. 2;

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

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a section on lines 5—5 of Fig. 2, and

Fig. 6 is a section on lines 6—6 of Fig. 2.

The mixing apparatus selected to illustrate the novel features of this invention, comprises a standard having a receptacle receiving and holding base plate 10, an upright member 11, and a horizontally extending part 12 which is detachably secured to the upright 11 for adjustment laterally and vertically with respect to the plate 10, and a motor driven mixing device. The motor driven mixing device comprises an electric motor 13, having a handle 14 secured to and extending at right angles with respect to the axis of the armature shaft 15, from the motor casing, a gear box or housing 16, a pair of beating elements 17 and 18, and suitable interconnecting gearing between the motor and the beating elements.

The motor 13 is provided with a casing end member 19, an intermediate casing member 20, and another end member 21. The field core 22 of the motor is clampingly engaged by the intermediate member 20, by means of bolts 23 that also secure the handle 14 to the motor. The casing end member 21 is secured to the member 20 by means of nuts 24, that threadingly engage an end of each of a plurality of bolts 25. The bolts 25 pass entirely through the motor casing and extend outwardly through openings in the casing end member 19, being reduced in diameter at the extended portion thereof to form a shoulder 26 on which abuts the inner surface of member 19. A spacing sleeve 27 is disposed over each bolt between the field core 22 and the inner surface of the casing member 21, to space apart these parts. The casing member 19 is provided with a centrally disposed opening 28 through which the armature shaft 15 extends.

The portion 32 of the armature shaft 15, which extends through the opening 28 in the casing member 19, is provided with gear teeth which are preferably spirally formed thereon, and adapted to mesh with the teeth of

a spiral gear 29 within the gear housing or box 16. The gear housing 16, in this instance, is preferably a die casting and is provided with suitable openings to receive the extensions of the bolts 25. Nuts 30 threadingly engaging the bolts 25, clamp the gear housing 16 to the casing member 19, and the latter to the other parts of the motor and casing thereof. The nuts 30 are adapted to be received in pockets 42 formed in the upper surface of the horizontally extending member 12, and when disposed therein cooperate therewith to position the mixing device relatively to a receptacle received and held by the base plate 10.

The gear housing 16 is provided with a journal bearing 31, adapted to receive the extended portion of the armature shaft 15. In this instance, the bearing member 31 is formed integral with the gear housing and extends through the opening 28 in the motor casing member 19, and along the shaft 15 to provide sufficient bearing therefor.

The toothed end 32 of the armature shaft 15 and the gear 29 are disposed within a chamber 33 of the housing 16, the chamber 33 completely enclosing the same and being sealed by the cooperation of the gear housing 16 and the end face of motor casing member 19, so as to be adapted to receive grease or other heavy lubricant and to retain it therein. The armature shaft 15 and the bearing 31 are oiled by the provision of an opening 34, leading outwardly from the shaft opening in said bearing, into which is disposed a fibrous body 35. A hollow tubular oil receptacle 36 threads into the opening 34 and forms a retainer for a supply of oil, as well as the means to adjust the tension of a coil spring 37, disposed therein and adapted to press against the fibrous body or wick 35, to cause it to engage the shaft 15 to lubricate the same.

The gear housing 16 is also provided with a bearing member 38, which extends from a wall thereof and in which a bearing for a shaft 39 is provided. The shaft 39 extends into the chamber 33 and is secured to the gear 29 by means of a key 40, and a nut 41, which clamps the gear 29 securely to the shaft 39 against a shoulder formed thereon. A gear pinion or member 44, having a hub portion 43 associated therewith, is firmly secured to the outer end of the shaft 39, in this instance by riveting over a reduced portion 45 of said shaft.

The outer surface of the bearing member 38 is tapered, being smaller in diameter at its outer end, and is adapted to snugly fit into a tapered opening provided in a beating element supporting member 46. An oil hole 47 is provided in the member 46 and the bearings 38, through which the shaft 39 may be lubricated. The member 46 is provided with a pair of spaced apart openings 48 and 49, which are adapted to receive the spaced apart ends 51 and 52 of a beating element supporting frame. The frame is loop shaped, the closed end 53 forming spaced apart bearings 54 and 55 for the beating elements 17 and 18 respectively, that rotate about the arms 56 and 57 of the frame. A thumb screw 58 threadingly engaging the member 46 within an opening provided therefor, is adapted to clampingly engage one of the frame ends, in this instance 51, to secure the frame and the beating elements to the supporting member 46. By loosening the screw 58, the spaced apart frame ends 51 and 52 may be removed from the respective openings 48 and 49, to permit proper cleaning of the beating elements 17 and 18 after their use.

The beating elements 17 and 18 are provided with gear pinions or members 59 and 60 respectively, pinion 59 being adapted to mesh with the pinions 44 and 60, while the pinion 60 is only permitted to mesh with pinion 59, thus rotation of the pinion 44 will rotate the beating elements in opposite directions. The pinions 59 and 60 are secured to the respective beating elements 17 and 18, adjacent the ends 51 and 52 of the frame, and are retained in proper spaced apart and meshed relation with each other by a strap 61, secured to the ends 51 and 52. A lug 62 is provided, in this instance being formed integral with the member 46, and extends outwardly from a surface thereof and disposed thereon adjacent the meshing point of the pinions 59 and 44. The lug 62 is provided to prevent the fingers of a user of the device being injured by, or of foreign articles being drawn into, the teeth of the pinions at this point.

In the mixing apparatus above described, provision has been made whereby the beating elements 17 and 18 are readily detachable. This is accomplished by loosening the thumb screw 58 and removing the frame ends 51 and 52 from the openings provided therefor in the element support 46. These frame ends being retained in spaced apart relation by the strap 61 may be readily inserted into the openings and again secured in position by the thumb screw 58. This feature permits the removal of the beating elements from the apparatus without disturbing the other parts thereof and facilitates their cleaning.

By the provision of the enclosed gear housing 16, the gear 29 and toothed shaft end 32 are protected against splashings from the material being beaten or mixed, and may also be properly and continuously lubricated. The casing end member 19 protects the interior of the motor 13 against splashes from the material being beaten by presenting a closed surface toward the receptacle holding base 10. The provision of common means, such as the bolts 25, to clamp the motor casing parts together, as well as to secure the gear housing thereto, facilitates the disas-

sembly of the device for inspection and repairs, and also provides suitable supporting means whereby the device may be properly supported and positioned upon a supporting standard with respect to the receptacle receiving base plate 10, the ends of bolts 25, or the nuts 30 thereon, cooperating with the pockets 42, to prevent lateral twisting of the device upon the horizontally disposed member 12 of the standard.

The bracket 12 is shaped as a fork presenting two arm portions 12^a, with terminal portions 12^b which are spaced from each other. In the preferred form, the arms 12^a and bracket body form an interior space 12^c of oval shape, open at that side which is directed away from the post or upright 11. The open space 12^c in the bracket is of such size and shape as to permit the enlarged lower ends of the parallel beaters to pass down through the bracket in a vertical direction when the motor device is placed on the support with the beaters in the receptacle; and when the operation of beating or mixing has been completed, the motor device may be lifted vertically from the support so as to draw the parallel generally circular beaters upwardly through the bracket. Preferably, also, the space at the open side of the bracket is such as to permit, if desired, the lateral withdrawal of the agitator from the stand when the former is at such an elevation that the shanks of the parallel beaters come opposite to the open part of the bracket. The device may, if desired, be assembled by lining up the beater shafts transversely to the elongated bracket opening and passing them laterally through the bracket mouth, after which the motor device is turned and lowered into position in an obvious manner; and if desired, the motor operated agitating device may be removed from position by a reversal of this operation, that is to say, lifting it and then turning it so that the shafts of the beaters pass out of the bracket mouth laterally one after the other. However, as stated above, the assemblage and disassemblage may be effected by vertical movement of the motor operated device so as to move the lower ends of the beaters vertically through the bracket space 12^c. There is, therefore, no difficulty about the matter of convenient assemblage and disassemblage of the parallel shafted beating device with respect to the standard.

The provision of the bearing 31 for the armature shaft 15, as a part of the gear housing 16, insures the efficient operation of the device by facilitating the machining of the journal bearings 31 and 38 in proper relation to each other, thereby insuring the correct meshing of the teeth of the shaft end 32 with the teeth of the gear 29. The provision of a tapered outer surface upon the bearing member 38, which cooperates with a tapered opening in the element support 46, insures that the pinions 44 and 59 will properly mesh, and permits the rigid securing of these parts together by friction without the use of other fastening means.

I do not claim broadly herein the combination of an electric motor having a casing and an armature shaft extending from said casing, a gear housing secured to one end of said motor casing and having a bearing member in which said armature shaft is journaled, gearing within said housing in engagement with said armature shaft, and a shaft driven by said gearing and extending outwardly from said housing in an elongated sleeve serving as the bearing therefor and formed integrally with said housing, or other features claimed in my application Serial No. 339,785, filed February 14, 1919.

Neither do I claim broadly herein a mixing apparatus or the like comprising a stand having a horizontally projecting bracket, an electric motor having its shaft disposed vertically, said motor being located above said bracket in spaced relation thereto, a handle on said motor, a mixing element driven by said motor shaft and disposed below said bracket, and means interposed between the upper face of said bracket and the lower face of the motor for supporting the motor in such upwardly spaced relation to the bracket, the motor being freely movable vertically in an upward direction away from the bracket, or other features claimed in my application, Serial No. 262,539, filed March 7, 1928.

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

What I claim is:

1. In apparatus for mixing and beating, an electric motor having a casing and an armature shaft extending from said casing, a gear housing secured to one end of said motor casing and having a bearing member in which said armature shaft is journaled, a beating element detachably secured to said gear housing, gearing within said housing in engagement with said armature shaft, and means between said gearing and said beating element to drivingly connect the same.

2. In apparatus for mixing and beating, an electric motor having a casing and an armature shaft extending from said casing, a casing end member enclosing one end of said motor, a gear housing abutting said casing member, and common means to secure said gear housing and clamp said casing member to said motor, in combination with a standard to support said motor, and means including a part of said standard cooperating

with said common securing means to position said motor upon said standard.

3. In a mixing apparatus, an electric motor having a shaft, a pair of parallel beaters with enlarged lower ends, depending from said motor and detachably connected thereto and geared to said motor shaft to be driven therefrom, and a standard for said motor having a horizontally disposed bracket on which the latter rests, said bracket being provided with an opening through which said beaters are withdrawable when the motor is removed from the stand, said bracket being of forked shape and presenting a side opening through which the shanks of the parallel beaters may be laterally removed and means disposed below said bracket for detachably connecting said beaters to said motor.

4. In a mixing apparatus, the combination with an electric motor member having a vertical shaft, and a casing, said shaft extending downwardly beyond the casing, of a housing applied to the lower face of the motor casing and containing gears driven from said motor shaft, a shaft projecting downwardly from said housing and carrying an additional gear upon the outer end thereof, a pair of parallel beaters detachably secured to and depending from said housing each having a gear secured thereto, said gears being continuously in mesh with each other, one of said gears meshing with said gear carried by said shaft, and a standard comprising a bracket on which said housing rests removably with said beaters disposed beneath said bracket.

5. In a mixing apparatus, the combination with a motor member having a casing and a vertical shaft, said shaft extending downwardly beyond said casing, of a housing applied to the lower face of said motor casing and containing gears driven from said motor shaft, a pair of parallel beaters carried by said housing and depending therefrom and driven from said motor shaft through said gears, and a supporting stand for said device having a horizontally disposed part detachably engaging the under portion of said housing, said beaters extending below said part.

6. In a mixing apparatus, the combination with a motor member having a casing and a vertical shaft, said shaft extending downwardly beyond said casing, of a housing applied to the lower face of said motor casing and containing gears driven from said motor shaft, a pair of parallel beaters carried by said housing and depending therefrom and driven from said motor shaft through said gears, and a supporting stand for said device detachably engaging the under portion of said housing at a point above said beaters.

7. In a mixing apparatus, the combination of an electric motor having a casing and a vertical shaft, said shaft extending downwardly beyond the casing, a housing applied to the lower face of said motor and containing gears driven from the motor shaft, a support secured to said housing beneath the same, and a pair of parallel beaters attached to and depending from said support and driven from said motor shaft through said gears, a standard for the aforesaid beating mechanism comprising a horizontally disposed bracket having an opening therein to permit said beaters to pass therethrough, said housing extending across the opening in said bracket and engaging the same to support the aforesaid beating mechanism thereon, said beater support being disposed within the opening in said bracket and extending below the same.

8. In a mixing apparatus, an electric motor having a casing and a vertical shaft extending downwardly beyond the casing, a housing applied to the lower face of said motor and containing gears driven from the motor shaft, a support secured to said housing beneath the same, and a pair of parallel beaters attached to and depending from said support and driven from said motor shaft through said gears, said beaters being readily detachable from said support.

9. In a mixing apparatus, an electric motor having a casing and a vertical shaft, said shaft extending downwardly beyond the casing, a housing applied to the lower face of said motor and containing gears driven from the motor shaft, a support secured to said housing beneath the same, and a pair of parallel beaters attached to and depending from said support and driven from said motor shaft through said gears, said beaters being readily detachable from said support, said beaters having gears which are in mesh with each other when the beaters are detached from the support as well as when they are attached thereto.

10. In a mixing apparatus, a frame having substantially parallel upper leg portions, a pair of beaters mounted on said frame having gears meshing with each other, means permanently spacing the upper ends of the frame legs so that said gears are maintained in mesh with each other, means to which the upper ends of said frame are detachably connected without disturbing the mesh of said gears, and means on said last named means for driving one of said gears.

11. An attachment for mixing devices comprising a substantially U-shaped frame member, beaters rotatably mounted on the respective legs of said frame member, said beaters carrying gears meshing with each other, and a strap connecting the legs of said frame adjacent said gears and holding the latter permanently intermeshed, the upper ends of said frame member legs being ex-

tended beyond said strap for detachable engagement with a supporting member.

12. In a mixing apparatus, the combination of a motor member having a casing, a vertical shaft, a housing connected to the lower face of the motor casing and containing gears driven from the motor shaft, a support secured to said housing, and a beating attachment detachably secured to said support and comprising a pair of intergeared beater members driven from the gears in said housing.

13. In a mixing apparatus, the combination of a motor member having a casing, a vertical shaft, a housing connected to the lower face of the motor casing and containing gears driven from the motor shaft, a support secured to said housing, and a beating attachment detachably secured to said support and comprising a pair of intergeared beater members driven from the gears in said housing, said beater members maintaining their intergeared relation when removed from said support.

14. In a mixing apparatus, a stand having a horizontally projecting bracket, an electric motor having its shaft disposed vertically, said motor being located above said bracket in spaced relation thereto, a handle on said motor, a pair of rotary beating elements driven by said motor shaft and disposed below said bracket, and a housing interposed between the upper face of said bracket and the lower face of the motor casing and containing gears through which said beating elements are driven, said housing forming a means for detachably supporting and spacing the motor from the upper face of said bracket.

15. In apparatus for mixing and beating, an electric motor having a casing, gearing drivingly connected to said motor, a housing enclosing said gearing, and a pair of beating elements detachably secured to said housing, each of said beating elements having a gear secured thereto, means drivingly connecting said gears with the gearing in said housing, said gears being in mesh, and means to connect said pair of beating elements to permit their removal as a unit from said housing without disturbing the meshed relation of said gears.

16. In apparatus for mixing and beating, an electric motor having a casing, a gear housing abutting said casing, common means to secure said gear housing to said casing and to clamp said casing to said motor, said common securing means extending beyond said gear housing, in combination with a standard to support said motor, and means including a part of said standard cooperating with the extending portion of said common securing means to position said motor upon said standard.

17. In apparatus for mixing and beating, an electric motor having a casing, a gear housing abutting said casing, a plurality of common securing means to secure said gear housing to said casing while clamping said casing to said motor, in combination with a standard to support said motor, said standard having depressions in a face thereof, each of said common securing means extending beyond said gear housing and disposed in one of the depressions in said standard and cooperating therewith to position said motor upon said standard.

18. In apparatus for mixing and beating, an electric motor having a casing, a gear housing abutting said casing, means to secure said housing to said motor, said securing means extending through said gear housing and projecting beyond the same, a bracket for supporting said motor and gear housing, said bracket having means to receive the projecting portion of said securing means to position said motor upon said standard.

19. In a mixing apparatus, an electric motor having a vertically disposed shaft, speed reduction gears driven by said shaft, a housing about said gears, a driven shaft extending from said housing, a gear on said shaft without said housing, a horizontally disposed bracket to detachably engage and support said gear housing, said last named gear being disposed below said bracket, and a beating element detachably secured to said gear housing and disposed below said bracket, and means drivingly connecting said beating element with said gear.

20. In a mixing apparatus, an electric motor having a gear housing secured to an end thereof, a horizontally disposed bracket having an opening therein below said housing, said housing extending across the opening in said bracket and engaging said bracket to be supported thereby, a beating element disposed below said bracket, connecting means between said beating element and said housing, and means extending through the opening in said bracket to drive said beating element.

21. In a mixing apparatus, an electric motor having a gear housing secured to an end thereof, a horizontally disposed bracket having an opening therein below said housing, said housing extending across the opening in said bracket and engaging said bracket to be supported thereby, a driven shaft extending from said gear housing through the opening in said bracket, a beating element support secured to said housing and disposed below said bracket, a beating element secured to said support, and means drivingly connecting said beating element with said driven shaft.

22. In a mixing apparatus, an electric motor having a gear housing secured to an end thereof, a horizontally disposed bracket having an opening therein below said hous-

ing, said housing extending across the opening in said bracket and engaging said bracket to be supported thereby, a driven shaft extending from said gear housing through the opening in said bracket, a beating element support secured to said housing and disposed below said bracket, a beating element, means disposed below said bracket to detachably connect said beating element to said support, and means drivingly connecting said beating element with said driven shaft.

23. In a mixing apparatus, the combination of a motor member having a casing and a vertical shaft, a housing connected to the lower face of the motor casing and containing gearing driven from the motor shaft, said housing having a bearing sleeve depending therefrom, a shaft in said sleeve driven by said gearing and a beating attachment secured to said sleeve and comprising a pair of beater members driven from said last named shaft.

24. In a mixing apparatus, the combination of a motor member having a casing and a vertical shaft, a housing connected to the lower face of the motor casing and containing gearing driven from the motor shaft, said housing having a bearing sleeve depending therefrom, a shaft in said sleeve driven by said gearing, a supporting member secured on said sleeve and a beating attachment detachably secured to said supporting member and comprising a pair of beater elements, and means for driving said beater elements from the shaft in said sleeve.

In witness whereof, I have hereunto set my hand this 12th day of February, 1929.

ALFRED C. GILBERT.