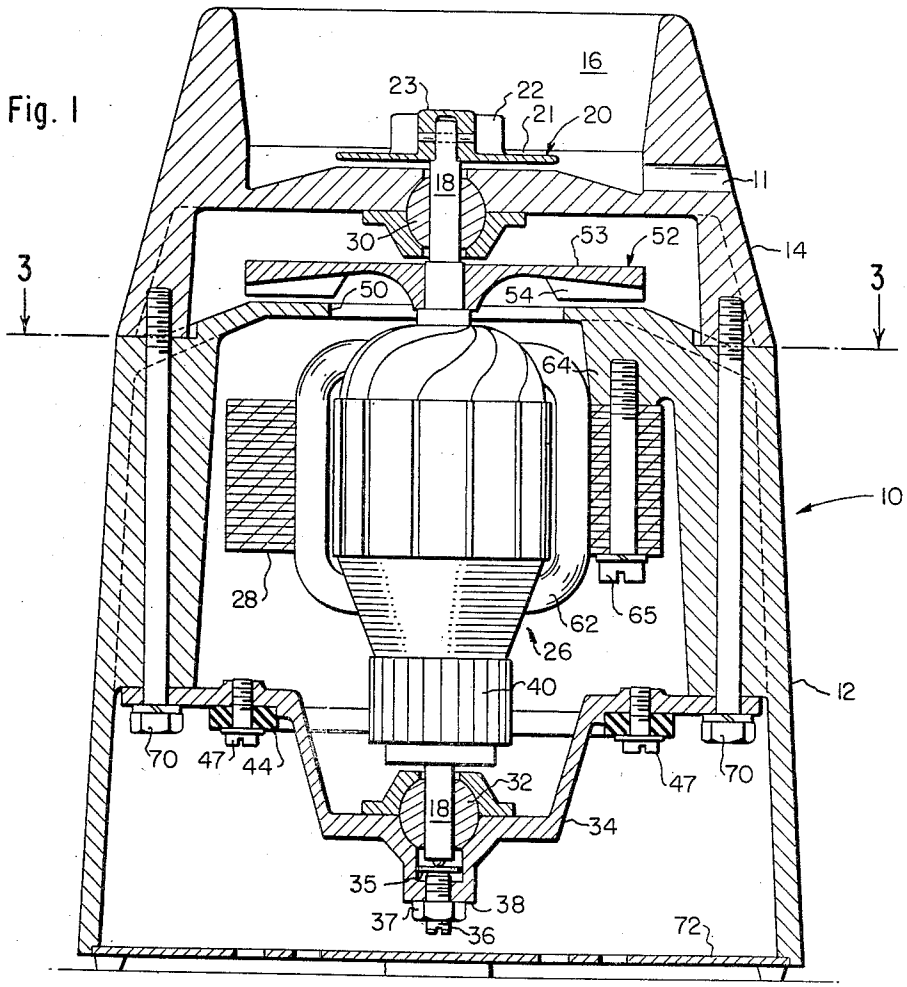
Feb. 4, 1958 A. BRAUN ET AL 2,822,485

DRIVING UNIT FOR MIXING DEVICES

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Fig. 1



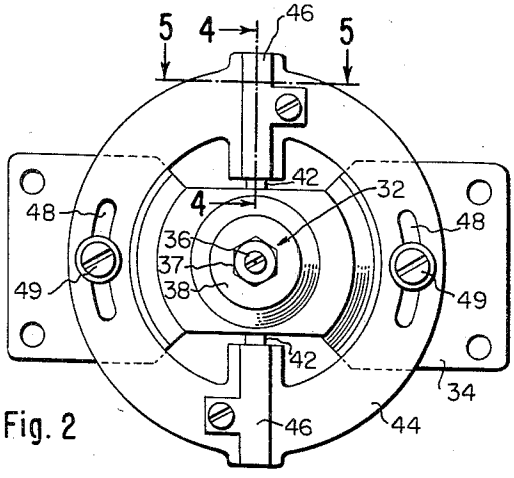
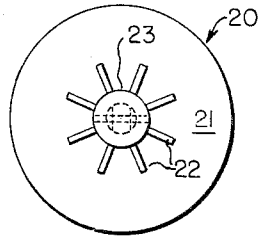


Fig. 2

Fig. 7



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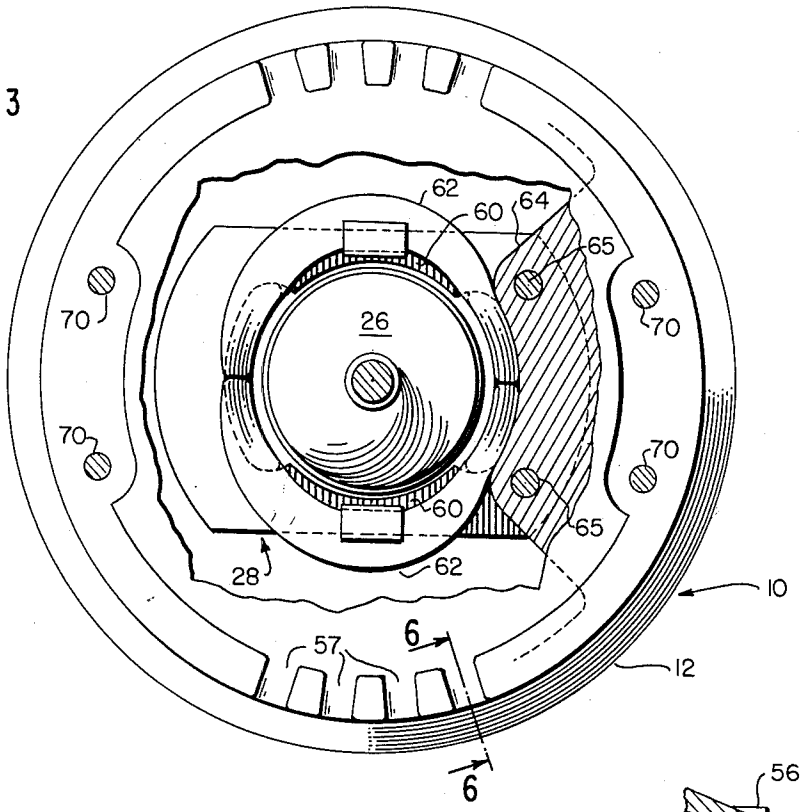
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DRIVING UNIT FOR MIXING DEVICES

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Fig. 3



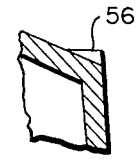


Fig. 6

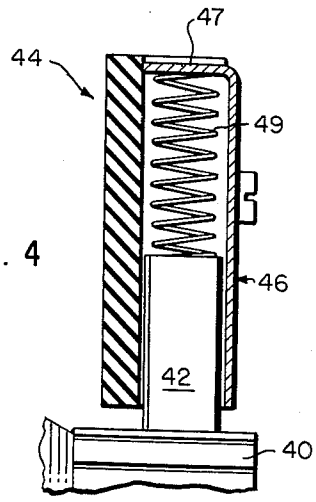


Fig. 4

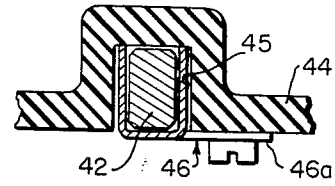


Fig. 5

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DRIVING UNIT FOR MIXING DEVICES

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Claims priority, application Germany July 15, 1954

9 Claims. (Cl. 310—157)

The present invention relates to a driving unit for mixing devices, particularly those formed as a base member housing a motor, the shaft of which terminates in a vertical extension connecting with a coupling member situated within a recessed socket in which the mixing device is accommodated.

The primary object of the invention is to provide a construction in which the casing serves as the motor housing with the components of the motor being each secured independently to the casing. In providing a construction of this type, it will be readily apparent that the motor parts must be assembled and retained sturdily in their proper functional relationship and must also be secured in proper relationship with the casing, since the latter serves to accommodate and locate the mixing device. In addition, proper electrical insulation must be provided so that the device will meet adequate safety standards. Particular problems involved in the construction therefore, involve typically the accurate location of the drive shaft with respect to the casing, and the proper assembly of the other motor elements about the motor armature connecting with the drive shaft.

In providing a construction of this type, this invention includes numerous novel features of construction by which a simplified, rugged, dependable and safe unit is provided.

In general, the driving unit is organized about an upright casing, the top of which is recessed to accommodate the mixing jar and is provided with a central spindle joined to a coupling device. The casing is formed of a plastic material as mating upper and lower parts, each provided with a shaft bearing. The parts of the casing are accurately positioned by any of several well-known means such as pins and slots or other interlocking parts and are fastened together by appropriate means such as bolts engaging integral enlarged regions of the shells.

The drive motor is formed of an armature mounted on an armature shaft carried between the bearings in the casing shells, and a stator secured independently of the armature and armature shaft to one of the casing shells in proper relationship to the armature. Appropriate electrical connections are, of course, also provided.

In preferred embodiments, the lower armature bearings are carried by a lower end yoke spanning the diameter of the lower casing shell and thereby serving to reinforce it, while at the same time, supporting the armature and armature shaft. The stator comprising the coils and poles of the motor is, in the preferred embodiment, mounted to an abutment near the top of the lower casing shell. Conveniently, the stator is secured only at one end and extends in cantilever fashion out and around the armature.

With the armature so supported between the upper and lower casing shell, it may be accurately positioned not only with respect to the other motor components carried by the lower shell, but also with respect to the recessed region in the upper shell in which the mixing device is accommodated.

A further feature of preferred embodiments of this invention is the provision of a centrifugal fan device on the armature shaft in a recessed region between the two casings and above the armature. Openings in the casing wall in or near general alignment with the fan, permit proper air flow, and these are conveniently provided by forming serrations or a series of grooves at the edges of one of the casing shells. A fan of this type, having a disk-shaped base, serves not only to create a cooling air flow through the casing shells and past the motor components, but also serves as a centrifugal throw disk by which any fluid seeping down the shaft is centrifugally forced outwardly, and thereby prevented from flowing into the armature.

These and other objects and features of this invention will be more readily understood and appreciated from the following detailed description of the preferred embodiment selected for purposes of illustration and shown in the accompanying drawings in which:

Fig. 1 is an elevation in cross-section of the preferred embodiment of the mixing device of this invention;

Fig. 2 is a bottom plan view showing the yoke and the structure supporting the commutator brushes;

Fig. 3 is a top plan view taken at section 3—3 of Fig. 1, with parts broken away to reveal structural details of the motor;

Fig. 4 is a longitudinal cross-section at 4—4 of Fig. 2 showing the brushes and part of the commutator;

Fig. 5 is a transverse cross-section at 5—5 of Fig. 2 showing the brushes and the structure mounting them;

Fig. 6 is a section at 6—6 of Fig. 3 showing the serrations in the top of the lower casing shell defining air vents, and

Fig. 7 is a top plan view of the coupling device.

The drawings show the preferred embodiment of the invention as it is applied to a drive unit especially adapted to power a household mixing device comprising a container having a shaft coupling extending through the bottom and connecting with appropriate internal mixing blades. The drive unit is housed in a casing 10 formed of a lower casing shell 12 and an upper casing shell 14. The latter is recessed at its top to form a socket 16 for accommodating and supporting the mixing device. A channel 11 from the socket serves as a drain for any liquid that may happen to spill.

A drive shaft 18 extending through the bottom of the socket 16 connects with a coupling 20, in the form of a base disk 21 having a hub 23 outwardly from which extend radial splines 22. The mixing container will be provided at its bottom with a complementary coupling having slots into which the splines 22 may extend when the container is set upon the drive unit. The coupling is preferably made of plastic and connects to the shaft 18 at a flattened end and is held in place by a pin 17 extending through the shaft and hub, with the ends of the pin situated flush with the hub.

The drive unit is powered by an electric motor of conventional construction, comprising an armature 26 carried by the drive shaft 18 and a stator 28 mounted to the lower casing shell 12. Proper orientation of the drive shaft 18 is maintained by mounting it between an upper self-aligning bearing 30 in the bottom of the upper casing shell 14 and a lower self aligning bearing 32 carried by a yoke 34 spanning the lower portion of the lower casing shell 12. The lower bearing is preferably also provided with an adjustable thrust plate 35 supported on a threaded support 36 by which the vertical position of the drive shaft 18 may be varied. A nut 37 on the threaded support 36 permits the latter to be tightened in position by tightening the nut against a shoulder 38 formed on the yoke 34.

Power to the armature 26 is supplied through a commutator 40 by means of carbon brushes 42. The brushes

are carried by a ring 44 fastened at diametrically opposite points to the upper portion of the yoke 34 and formed with opposed radial troughs 45 in which the brushes 42 are held by interlapping retainers 46 formed as channels having an end wall 47 and a lateral extension 46a through which the retainers are fastened to the ring. A spring 49 active between each brush 42 and the retainer end wall 47 urges the former in constant contact with the commutator. The ring 44 is formed of an insulating material, such as plastic and the retainers 46 of metal, to permit appropriate electrical connection to be made to the brushes while keeping them insulated from each other and from the rest of the casing 10.

The ring 44 is conveniently formed with opposed slots 48 and secured to the lower side of the yoke 34 by screws 49 extending through the slots. This form of construction facilitates assembly, in permitting the ring 44 to be inserted and secured from the lower end of the lower casing shell 12 without interfering with, or being interfered with by, the other components. The slots 48 permit rotational adjustment of the brushes as required for best operation of the motor.

The upper end of the armature is housed in the upper portion of the lower casing shell 12 which is formed with a top opening at 50 through which the armature may be inserted and withdrawn during assembly and disassembly.

The stator 28, of generally conventional construction comprising a core formed with poles 60 surrounded by windings 62, is, in the preferred embodiment illustrated, positioned about the armature 26 and secured to an abutment 64 formed in the lower casing shell 12 at one side, by a pair of bolts 65. The stator thus extends in cantilever fashion around the armature.

A space provided in the bottom of the top casing shell 14 accommodates a centrifugal blower 52 formed as a disk 53 having depending radial fins 54. The disk 53 is secured to the drive shaft 18 and during operation serves to prevent any fluid which may seep down the shaft 18 from entering the armature. Any such fluid will be centrifugally expelled from the rotating disk. Spaced shoulders 56 formed in the outer edges of the upper mating surface of the lower casing shell 12 define air ports 57 through which air from the fan 52 is expelled.

The entire assembly is secured together by four bolts 70 which extend through and thread in enlarged portions of the casing shells 12 and 14, and which also hold the lower supporting yoke 34 in place.

From the foregoing description, it will be seen that the driving unit provided by this invention is of simple yet rugged and safe construction, and further that assembly and disassembly and repair of the unit are easily provided for by virtue of the independent mounting of the several components. In particular, it will be noted that the armature may be removed and replaced without interference by either the stator or the brushes simply by removing the top casing shell and withdrawing it. Similarly, the brushes may be removed and replaced without disassembling the entire unit, simply by removing the bottom plate 72 (if one is provided) and removing the ring 44.

Although this invention has been described in detail with reference to a preferred embodiment, it is contemplated that obvious modifications will occur to those skilled in the art and that such may be made without departing from the scope of this invention.

Having thus disclosed our invention we claim and desire to secure by Letters Patent:

1. A driving unit for mixing devices and the like comprising an upright hollow casing which forms the entire housing for said unit, said casing consisting of a lower casing shell and a mating upper casing shell and means fastening said shells together, the upper shell being recessed at its top to accommodate a mixing device, a shaft bearing in each of said shells, an electric motor armature and armature shaft supported by said shaft bearings with the shaft extending through the upper casing shell into the recessed region of the upper shell, an electric motor stator secured to the inside of the lower casing shell in operative relation to said armature and independently thereof, coupling means for engaging and operating the mixing device mounted on the end of the armature shaft within said recessed region, and means for energizing said electric motor armature and stator.

2. A driving unit for mixing devices and the like according to claim 1 wherein the lower casing shell is formed with an abutment at one side to which one side of the stator is secured, said stator being mouned in cantilever fashion.

3. A driving unit for mixing devices and the like according to claim 1 wherein the lower casing shell is open at its top to provide an opening through which the armature and armature shaft may be inserted and withdrawn.

4. A driving unit for mixing devices and the like according to claim 1 wherein the end of the shaft is flattened and the coupling means is correspondingly formed, and each is perforated to accommodate a pin, and a pin is provided to secure the coupling means on the shaft.

5. A driving unit for mixing devices and the like comprising an upright hollow casing which forms the entire housing for said unit, said casing consisting of a lower casing shell and a mating upper casing shell and means fastening said shells together, the upper shell being recessed at its top to accommodate a mixing device, an upper shaft bearing in the upper shell, bridging structure spanning the lower shell and a lower shaft bearing carried by said bridging structure, said bridging structure being mounted to said means fastening said shells together an electric motor armature and armature shaft supported by said shaft bearings with the shaft extending through the upper casing shell into the recessed region of the upper shell, an electric motor stator secured to the inside of the lower casing shell in operative relation to said armature and independently thereof, coupling means for engaging and operating the mixing device mounted on the end of the armature shaft within said recessed region, and means for energizing said electric motor armature and stator.

6. A driving unit for mixing devices and the like comprising an upright hollow casing which forms the entire housing for said unit, said casing consisting of a lower casing shell and a mating upper casing shell and means fastening said shells together, the upper shell being recessed at its top to accommodate a mixing device, a shaft bearing in each of said shells, an electric motor armature and armature shaft supported by said shaft bearings with the shaft extending through the upper casing shell into the recessed region of the upper shell, an electric motor stator secured to the inside of the lower casing shell in operative relation to said armature and independently thereof, coupling means for engaging and operating the mixing device mounted on the end of the armature shaft within said recessed region, said shells further being formed to provide a chamber surrounding the shaft above the armature, a centrifugal fan mounted on said shaft above the armature in said space, ports in the walls of said chamber to provide air circulation, and means for energizing said electric motor armature and stator.

7. A driving unit for mixing devices and the like according to claim 6 wherein the upper casing shell is recessed at its lower side to form the chamber.

8. A power unit for mixing devices and the like comprising an upright hollow casing including a lower casing shell open at its top and bottom, a yoke spanning the bottom of the lower casing shell, a thrust bearing carried by said yoke, an armature and armature shaft

supported on said thrust bearing, electrical contacting means associated with said armature, a ring of insulating material carrying brushes contacting said electrical contacting means, said ring being secured to the bottom of said yoke and in alignment with said electrical contacting means, an upper casing shell mating with said lower casing shell, a bearing for said armature shaft in said upper casing shell cooperating with said thrust bearing to position the armature and armature shaft, a stator surrounding said armature mounted within said lower casing shell, and means for energizing said armature and stator.

9. The power unit defined by claim 8 wherein the opening in the top of the lower casing shell is sufficiently large to permit passage of the armature therethrough.

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