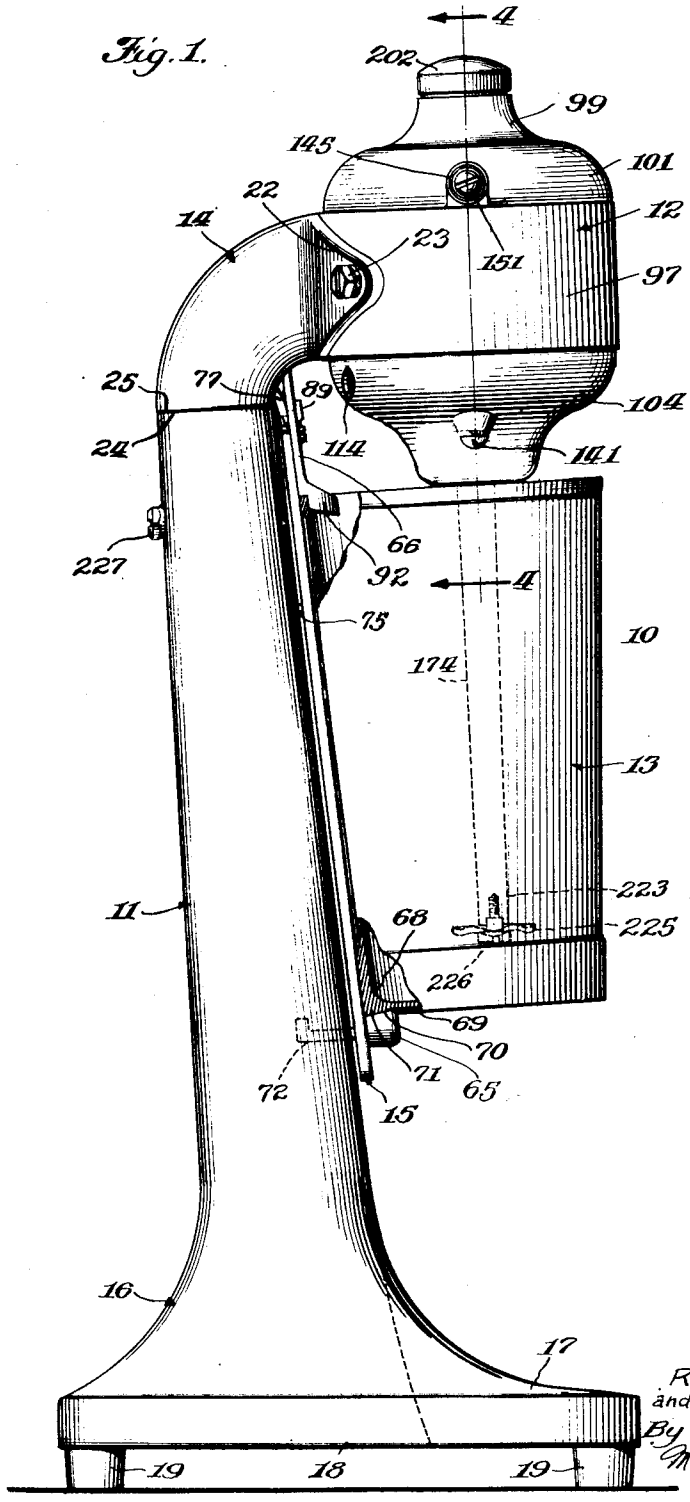
Feb. 2, 1932. R. A. BLISH ET AL 1,843,315

DRINK MIXER

Filed Jan. 9, 1929 4 Sheets-Sheet 1

Fig. 1.



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DRINK MIXER

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Fig. 2.

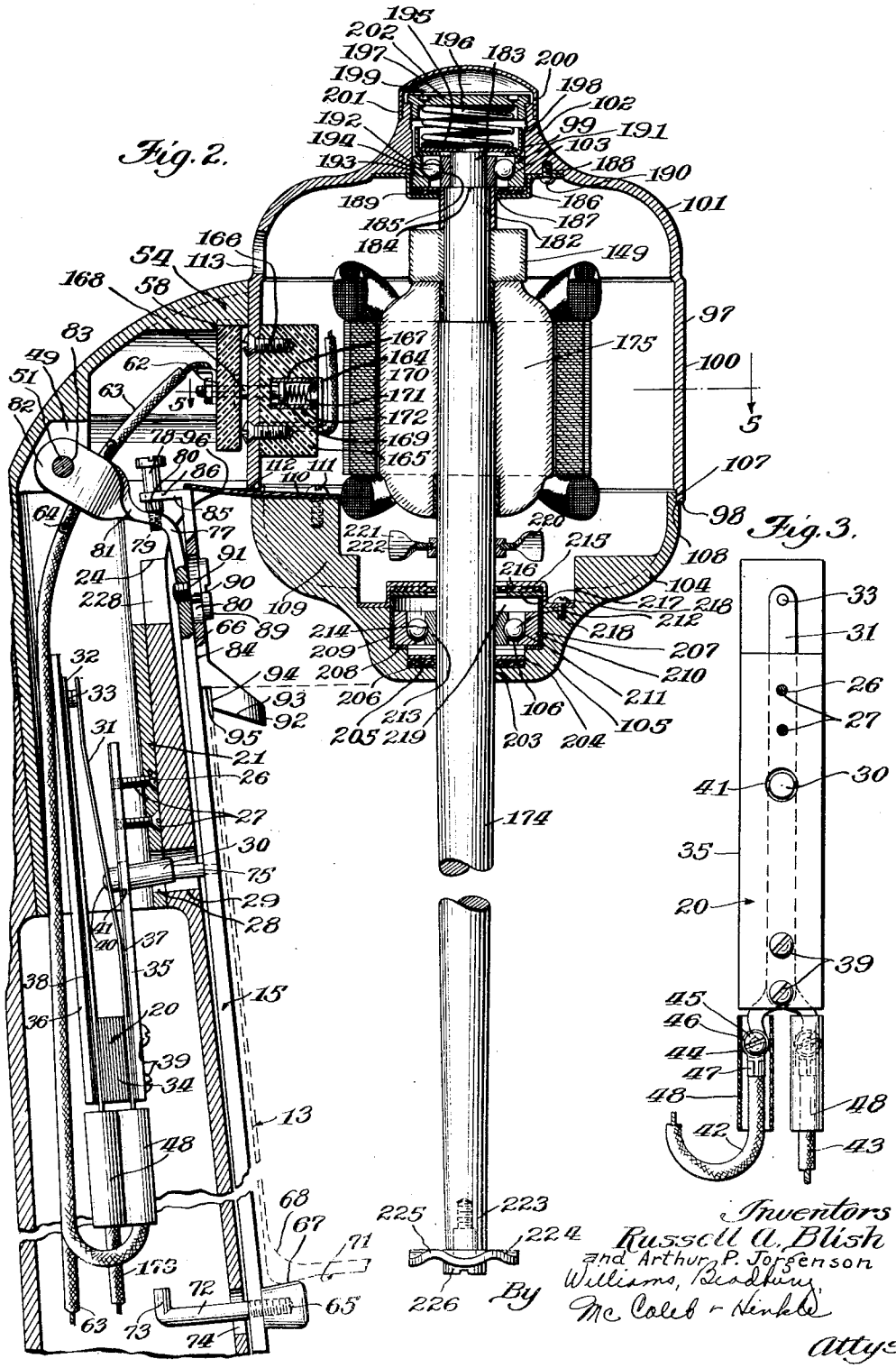


Fig. 3.

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DRINK MIXER

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Fig. 4.

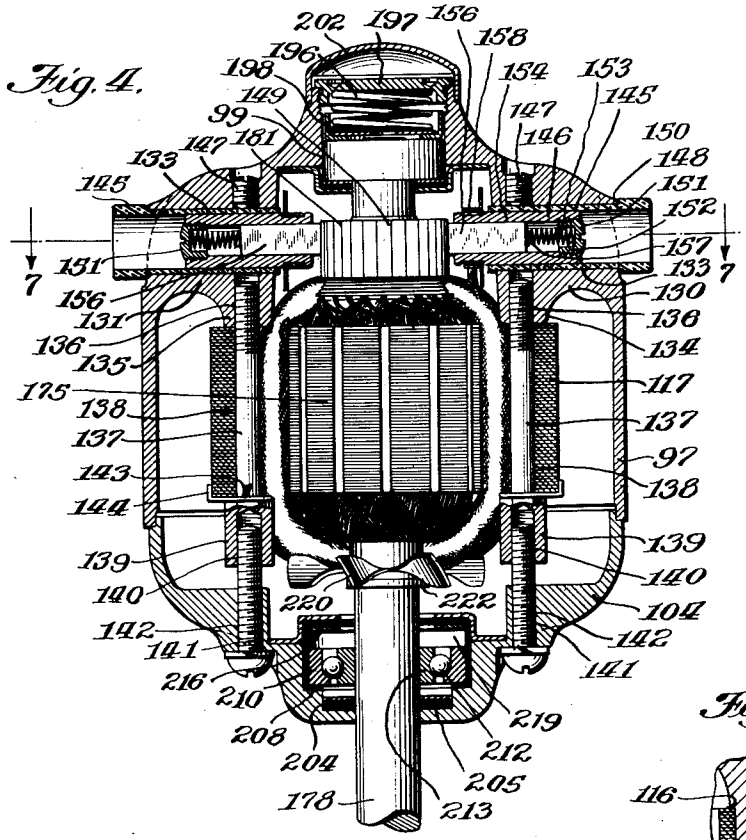


Fig. 9.

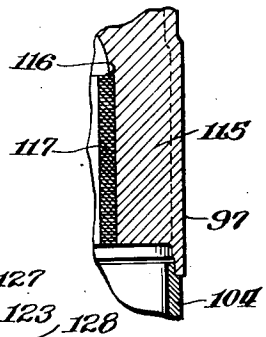
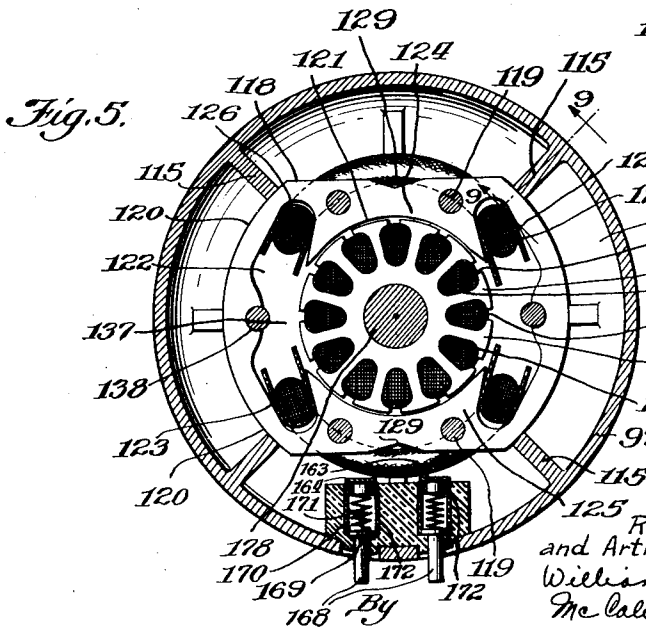


Fig. 5.



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DRINK MIXER

Filed Jan. 9, 1929 4 Sheets-Sheet 4

Fig. 6.

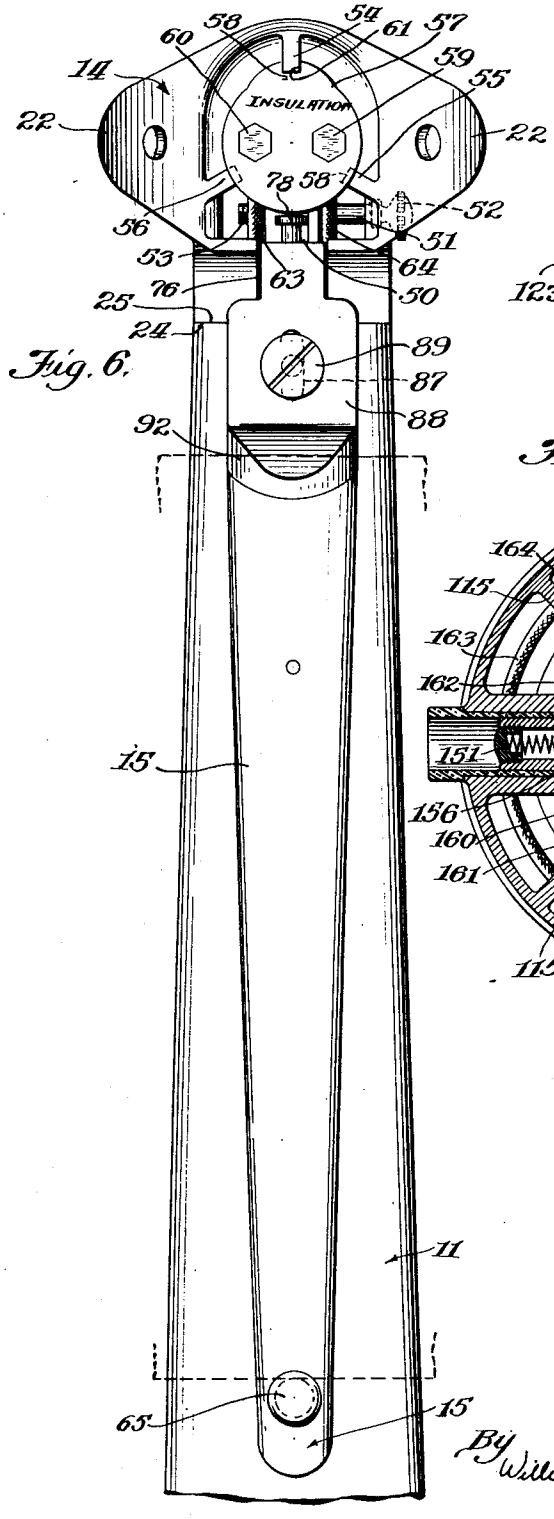


Fig. 8.

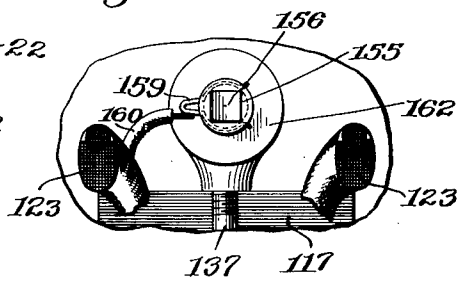
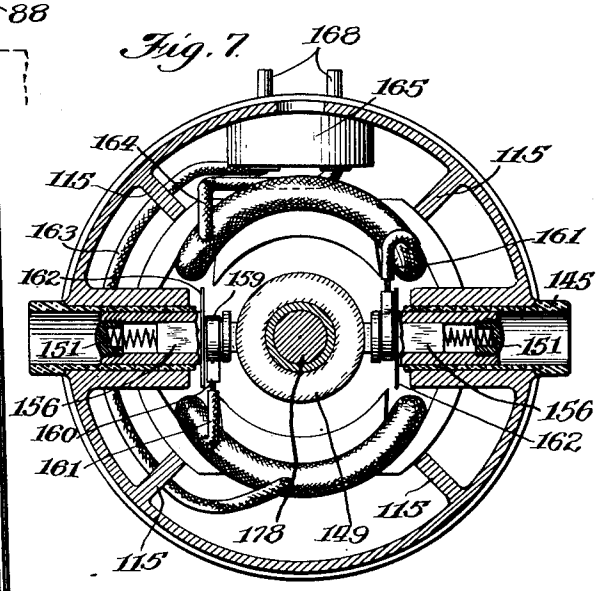


Fig. 7.



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UNITED STATES PATENT OFFICE

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DRINK MIXER

Application filed January 9, 1929. Serial No. 331,239½.

The present invention relates to drink mixers, and is particularly concerned with the provision of an improved drink mixer of the type shown in Patent No. 1,475,197 issued to Stephen J. Poplawski on November 27, 1923.

In the drink mixers of the prior art, the agitator shafts have been constructed of a plurality of sections secured together by a threaded or other connection between the agitator shaft and the motor shaft. It is practically impossible to secure a perfect alignment of motor shaft and agitator shaft where these parts are separately constructed and assembled afterward, but where the motor shaft and agitator shaft are constructed of a single integral piece, this member may be accurately machined in a single operation, and there is no possibility of misalignment between the agitator and motor shafts by subsequent assembly.

For instance, where threads are cut on or in an agitator shaft for attachment to a motor shaft, it is practically impossible by ordinary methods to cut a thread so that it is concentric with the axis of the shaft, because in the thread cutting operation, the die is fed by the threads cut and the depth of the threads depends on the hardness or softness of the shaft at the surface where the threads are formed.

If the shaft is a little softer, or for some other reason the die cuts better on one side of the shaft, the die will cut away more of the shaft there, and the threads will be deeper, and it will be evident that the exact location of the threads is a matter of chance. Furthermore, some readjustment takes place when the agitator shaft and motor shaft are screwed together, and it is inevitable that the agitator shaft will be out of alignment with the motor shaft when thus assembled.

If the threaded connection is slightly eccentric, the position of the agitator will change continually as it is threaded on the motor shaft and if the agitator is not perfectly aligned, it will not only rotate, but it will revolve in an orbit within the liquid to be mixed, causing a vibration of the motor, splashing, noise and other undesirable results.

Another mode of attaching two separate shafts for drink mixers comprises the pressing of the two shafts into a sleeve which involves the joining of two separately machined surfaces with a third element, and experience shows that it is also impossible to attain a perfectly aligned shaft with such a construction.

The common mode of construction includes a tapered metal sleeve with a forced frictional fit on the motor shaft and on the agitator shaft, and one of the principal objects of the invention is the elimination of the inherent defects of that type of construction, as follows:

With the sleeve type of joint between the agitator and motor shafts, the motor shaft and agitator shaft were usually out of alignment after assembly, and the motor was run by skilled artisans who would tap the agitator with a hammer to center the agitator with respect to the axis of the motor shaft, while the motor was running. The misalignment of the agitator shaft was thus corrected to a certain degree by bending the relatively slender shafts of the prior art, and by causing the shafts to shift in their tapered sleeves.

It was possible to secure an improvement in alignment and operation by this tapping operation, but a great deal of time was thus consumed, much skill was required, and only a temporary adjustment was actually accomplished.

For instance, if the motor were dropped on the floor or roughly handled in shipping, the shaft would revert to its former misalignment, or if the mixer were carried by grasping the agitator shaft by the hand, which happens to be convenient, or if anyone merely exerted a slight pressure on the end of the agitator shaft with the thumb, the misalignment would reappear, and rattling and vibration would result from the rotation of the eccentric agitator.

All this trouble has been eliminated by the provision of an integral elongated agitator and motor shaft, which carries the armature

laminations and which is substantially rigid, so that no bending is possible with ordinary forces, and which is machined accurately as an entirety.

The additional weight of such a thick integral shaft also gives the rotor sufficient inertia, so that it spins even after the control motor is shut off, and on removal of the container, the spinning agitator fluffs the beverage at the top as the beverage is removed from the agitator.

Where other modes of connection are used, other difficulties are encountered in aligning these separate agitator and motor shafts, but the provision of a motor shaft and agitator of a single integral piece greatly facilitates the accurate machining of this member and eliminates noise, vibration, splashing, etc., and is an important factor in the life and service of the machine.

The smooth and noiseless running qualities of a machine so constructed are readily noticeable to one skilled in the art, so that such a machine is more salable, and there is no doubt that the length of efficient service of the machine is greatly increased by this construction.

One of the objects of the present invention is the provision of an improved drink mixer which is capable of smoother operation, with less noise, vibration and wear, by virtue of a more perfect construction of the moving parts, including a motor and agitator shaft constructed of a single integral piece of metal.

The agitator shafts of drink mixers may also get out of alignment by being bent in shipment or use, and another object of the invention is the provision of a sturdy and serviceable drink mixer construction in which all possibility of misalignment of the motor and agitator shaft is eliminated.

Another object of the invention is the provision of an improved drink mixer construction, which is permanently closed against tampering, and which does not require attention for lubrication or other purposes during the normal life of the machine.

Another object is the provision of an improved drink mixer assembly, including an improved armature and shaft construction equipped with anti-friction bearings and means for providing a reserve supply of lubricant for said bearings.

Another object is the provision of an improved construction for a drink mixer, which is more easily assembled and more economically manufactured than the devices of the prior art.

Another object is the provision of an improved drink mixer control mechanism including an improved container support and means for actuating a motor switch by movement of said container support.

Other objects and advantages of the invention will be apparent from the following description and from the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawings, of which there are four sheets;

Fig. 1 is a side elevational view of our improved drink mixer with a few parts partially broken away to show the mode of support of the container;

Fig. 2 is a medial sectional view of the motor and standard, showing the internal mechanism;

Fig. 3 is an elevational view of the motor control switch;

Fig. 4 is a medial sectional view taken through the motor on the line 4—4 of Fig. 1;

Fig. 5 is a sectional view through the motor, taken on the line 5—5 of Fig. 2;

Fig. 6 is an elevational view of the standard showing the container support and motor supporting head;

Fig. 7 is a sectional view taken through the motor on the line 7—7 of Fig. 4; and

Fig. 8 is an end view of one of the motor brushes.

Fig. 9 is a sectional view of the motor wall through one of the ribs 115.

Referring to Fig. 1, 10 indicates in its entirety our new drink mixer assembly, which preferably includes a supporting standard 11, a motor 12, a container 13, a motor supporting head 14 and a container support 15.

The standard 11 may consist of a hollow cast metal member curved outwardly as at 16 to form a base of greater stability.

The base 18 is bifurcated at its front side, forming a pair of legs 17 between which a container may automatically be centered. The base 18 is provided at its rear corners and at the legs 17 with rubber feet 19 secured to the base by screw bolts, and the entire cast metal standard may be coated with a layer of enamel or other finish, adapted to protect the cast metal against corrosion, to facilitate its maintenance in a sanitary condition, and to give the standard a distinctive and ornamental appearance.

The standard 11 carries a motor supporting head 14 which is adapted to support the motor 12 as well as the container support 15, and the supporting head 14 also carries the motor control switch indicated in its entirety at 20, in such manner that the switch may be easily assembled with the supporting head before the head is attached to the standard.

The supporting head 14 comprises a hollow cast metal member having a neck portion 21 adapted to be received in the upper end of the standard 11 and having a pair of laterally projecting flanges 22 which are curved to fit the exterior of the motor casing and provided with apertures for receiving screw bolts 23 by means of which the motor 12 is secured to the supporting head 14. The

standard 11 is preferably provided with an upper flat end 24 which is provided with a bore 23 adapted to receive the tubular neck 21 of the supporting head 14, and the supporting head 14 is made of substantially the same width and depth as the upper end 24 of the standard, so as to form a continuation thereof, and forming a shoulder 25 on the supporting head which finally determines the position of the supporting head 14 in the standard 11.

The neck 21 of the supporting head 14 is provided with a pair of countersunk apertures 26 adapted to receive the screw bolts 27 which support the motor control switch 20 within the standard 11, and the neck 21 and the standard 11 are provided with registering apertures 28 and 29 adapted to receive a button 30 carried by the switch 20 when the supporting head 11 is finally assembled with the standard.

The motor control switch 20 may consist of a pair of resilient steel contact leaves 31 and 32 provided at their outer ends with contact points 33 and secured together at the opposite ends and insulated from each other by a plurality of layers of insulating fiber 34. The contact leaves 31 and 32 may be reinforced and supported by providing a pair of metal plates 35 and 36, each of which is separated from its contact leaf, respectively, by a layer of mica 37 and 38 and the complete assembly of supporting plates, mica insulation, contact leaves, and spacing fiber 34 may be secured together by a pair of screw bolts 39.

It will be understood by those skilled in the art that the openings in the contact leaves 31 and 32 are such that these contact leaves are spaced from the bolts 39 at all points so as to be insulated from each other and from the bolts.

One of the contact leaves 31 is provided with a button 30 of insulating material having a metal pin 40 molded therein for the purpose of riveting the button 30 on the contact 31 and the adjacent metal plate 35 and mica sheet 37 are provided with apertures 41 to receive the button 30. The contacts 33 are normally opened and the leaf springs 31 and 32 are normally biased against the mica sheets 37 and 38, but the contacts 33 may be brought into engagement by pressure on the button 30.

The switch 20 may be supported within the neck 21 of the supporting head 14 by a pair of screw bolts 27 extending through the neck 21 and threaded into the plate 35. As the plate 35 is flat and the interior of the neck 21 is curved, the switch is supported in spaced relation to the apertures 26 of the screw bolts 27 (Fig. 2), but the plate 35 may be drawn into firm engagement with the curved walls of the neck 21 by the screws 27, and the switch 20 firmly secured thereby.

The lower ends of the contact leaves 31 and 32 may project below the switch assembly to provide a pair of electrical connectors for connection to the conductors 42 and 43. The contact leaves 31 and 32 are slotted as at 44 in order that a screw bolt 45 threaded into a metal plate 46 and soldered to the conductors 42 and 47, may be slid into the slot 44 and secured by tightening the screw 45. The connectors and screws are covered by a short tube or fiber 48 which is slid over the connector and retained in place by frictional engagement therewith, providing an insulating cover for the connector.

The supporting head 14 is curved at substantially right angles to hold the motor in spaced relation to the standard 11 and to provide sufficient room between the motor and standard for the container supporting mechanism. Within the supporting head 14 there are provided a pair of forwardly extending lugs 49 spaced from each other to form a slot 50 and the supporting head is provided with a transverse bore extending from one side of the supporting head through the lugs 49 and adapted to receive the screw bolt 51.

The screw bolt 51 is provided with a knurled head 52 and with a threaded end 53 adapted to be screwed in complementary threads in one of the lugs 49, and the lugs 49 with the bolt 51 provide a pivotal support for the upper end of the container support member 15.

The supporting head 14 is also provided with three radially extending ribs 54, 55 and 56 adapted to provide a support for a connector 57 and each of the ribs 54, 55 and 56 is formed with a shoulder 58 against which the connector 57 may rest. The connector 57 comprises a relatively flat molded bakelite member having a pair of screw bolts 59 and 60 secured therein by molding in the bakelite member, and the connector 57 is provided with a slot 61 which is adapted to receive the rib 54.

The connector 57 may be secured in place by frictional engagement with the edges of the ribs 54, 55 and 56, its final position being determined by the shoulders 58, and the connector is positively prevented from any rotative movement by engagement of the walls of the slot 61 with the rib 54.

The screw bolts 59 and 60 are provided with nuts for securing connectors 62 carried by conductors 63 and 64 and the connector 57 thus provides an electrical connection which is automatically connected to cooperating connectors on the motor 12 when the motor is secured to the supporting head 14 by the screw bolts 23.

The container supporting member 15 may be constructed of a relatively narrow strip of sheet metal which is provided at its lower end with a shoulder 65 for supporting the container 13 and at its upper end with a latch-

ing device 66 for engaging an upper portion of the container. The metal strip which comprises the container support 15 is preferably curved laterally to conform to the shape of the container and the latching device 66 is likewise given a complementary curvature to fit against the metal strip 15.

The shoulder 65 which supports the container 13 may consist of a button or nut of substantially frusto-conical shape tapering away from the outer end of the nut so as to engage beneath a depending annular shoulder 67 carried by the container 13. The container 13 may be of any convenient shape, but preferably comprises a stamped sheet metal member having rounded inner corners 68 and having a reinforced bottom which is slightly dished as at 69 and provided with a frusto-conical surface 70 which forms a depending annular shoulder 71. The nut 65 has a frusto-conical surface which may be of the same angularity as the frusto-conical surface 70 on the bottom of the container, and the engagement between these two surfaces is sufficient to retain the container on the supporting member 15 when the latching device 66 is in latching position; but when the latching device is unlatched, the container may be withdrawn from the nut 65 without catching or otherwise hindering the removal of the container.

The nut 65 may be secured in place by providing a threaded aperture in the container supporting member 15 and providing a threaded stop pin 72 which extends through the strip 15 for threaded engagement with the nut 65. The stop member 72 may have its opposite end bent at substantially right angles to provide a stop 73 for limiting the outward movement of the container support 15 and the standard is provided with an aperture 74 into which the stop pin 72 may be inserted if the container support 15 is held in the proper position as described hereinafter. When the parts are assembled, however, the end 73 of the stop pin 72 engages inside of the standard adjacent aperture 74, limiting the pivotal motion of container support 15. The container support 15 also carries a switch actuating member comprising a metal pin 75 which is threaded into the rear side of the strip 15 at a point opposite the apertures 28 and 29 so that the pin 75 is adapted to strike the button 30 of the switch 20.

At its upper end the container support 15 may be reduced in width as at 76 and the strip may be bent backward as at 77 to provide a portion adapted to receive a screw bolt 78 extending substantially parallel to the main portion of the strip 15. The screw bolt 78 is threaded into an aperture in the bent portion 77 of the container support 15 and the screw bolt is preferably provided with a threaded portion 79 of reduced size, forming an annular shoulder 80 which determines the final position of the bolt 78 in the strip. The bolt 78 is adapted to act as one of the guides for a latching device 66 further to be described.

Just past the bent portion 77 of the strip 15, the strip is twisted through an angle of 90° as at 81, so that the upper end 82 comprises a flat portion, the widest dimension of which extends vertically so that the flat portion 82 may be provided with an aperture 83 adapted to receive the horizontal screw bolt 51 upon which the container support 15 is pivoted. The flat portion 82 extends into the slot 50 of the motor supporting head and is engaged on either side by the forwardly extending lugs 49 which act as thrust bearings.

The latching device 66 may comprise a cast metal member having a rear curved surface 84 which is complementary to the curvature of the strip which comprises the container support 15. The latch 66 is provided with a transverse lug or flange 85 having an aperture 86 adapted to slidably receive the screw bolt 78 when the latch is assembled to slide on the container support 15. The latch is also provided with a slot 87 extending longitudinally of its main body portion 88 and adapted to receive a screw bolt 89 having a reduced threaded portion 90. The screw bolt 89 is thereby formed with a shoulder 91 determining the final position of the screw bolt when it is threaded into the supporting member 15 and preventing the head of the bolt 80 from binding against the sliding latch 66.

The lower end of the latch 66 is formed with a forwardly and downwarly extending flange or lug 92 having a lower camming surface 93 and an angular corner 94 cut out of its rear edge. The cut out 94, together with the strip 15 forms a slot 95 which is adapted to receive the upper edge of the container 13, and the camming surface 93 is adapted to guide the container into the slot 94.

The rear wall of the cut out 94 is curved, complementary to the inside of the container, and as previously described, the strip 15 is curved complementary to the exterior surface of the container so that the upper edge of the container is received in a curved complementary slot 95 which is adapted to permit sliding, rotative movement of the container but will positively prevent any wobbling or other movement of the container when the parts are in the position shown in Fig. 2.

The motor 12 is provided with a leaf spring 96 which projects rearwardly from the motor casing and which is adapted to engage the upper end of the latching device 66 and bias the latch into latched position when the motor is assembled with its standard. The leaf spring 31 of the motor control switch 20 is adapted to bias the container support 15 away from the standard until the stop 73 engages the inside surface of the standard 11

when the container is not in the mixing position.

The container may be removed by lifting upward on the container, causing the latch 66 to slide upward against the tension of the leaf spring 96 and a very slight upward movement of the container is sufficient to withdraw the frustro-conical shoulder 67 from the support of the nut or lug 65. After the container has been slightly lifted, the bottom of the container may be pivoted outward to remove it from the shoulder 65 and the container may then be moved downward from beneath the motor 12 and its agitator. The container may be placed in mixing position with a reverse movement, by moving the container up from below the motor 12 until its upper edge is in the slot 95. It should be noted that the slot 95 has sufficient tolerance to permit the necessary pivotal movement of the container within the slot.

This upward movement is continued until the frusto-conical lower edge of the container has been lifted sufficiently to be slid over the shoulder 65 and the container is then seated against the supporting member 15. The latch 66 is then maintained in latching position, engaging the upper edge of the container by means of the spring 96 and the curved slot which receives the upper edge of the container is adapted to hold the container firmly in the proper position for mixing the ingredients within the container. The weight of the container and its contents is adapted to cause the container support 15 to pivot in a clockwise direction, the pin 75 engaging the button 30 and actuating contact leaf 31 to a position closing the contacts 33 which control the motor circuit.

It will thus be observed that the motor circuit is closed by the placing of the container on the container support, the switch being actuated by movement of said container support.

The motor 12 is preferably constructed in such manner that it may be sealed against tempering by unauthorized persons and according to the present construction, it is unnecessary to open the motor casing for lubrication or other purposes during the normal life of the machine.

The motor 12 comprises a casing which may consist of a hollow cast metal member 97 having one end open as at 98 and having the opposite end formed with a bore 99. The casing 97 may be of any convenient shape, but is preferably provided with a substantially cylindrical body portion 100, the ends of the body being curved as at 101 to provide the casing with rounded ends, and the end is provided with a centrally located protuberance 102 which is adapted to house the mechanism associated with a self-lubricating anti-friction bearing indicated in its entirety at 103.

The open end 98 of the casing 97 is provided with a cover 104 which is of substantially the same shape as the curved end 101 of the casing, and which is provided with a protuberance 105 adapted to house the lower anti-friction bearing 106. The cover 104 is formed with an upper edge 107 of reduced diameter, thereby providing a shoulder 108 adapted to engage the open end 98 of the casing 97, and the reduced portion 107 of the cover is received within the casing 97. The cover 104 may also be formed with a lug 109 upon its interior, having a substantially horizontal surface 110 against which the leaf spring 96 is secured by a screw bolt 111 and casing 97 is provided with a slot 112 through which the leaf spring 96 may project. The slot 112 is of sufficient width to permit some bending of the leaf spring 96 throughout its entire length, thereby increasing the effective resilient length of the leaf spring 96.

The casing 97 is provided with a ventilation aperture 113 located just above the upper end of the supporting head 14 and with one or more ventilation apertures 114 located in the cover 104 below the supporting head 14.

The casing 97 may be provided with walls of substantially the same thickness throughout, forming a chamber which is of substantially the same shape as the exterior of the casing but the casing is provided with a plurality of radial ribs 115 extending longitudinally of the casing on the inside of the casing wall. The ribs 115 are slightly wider at one end, forming a shoulder 116 adapted to provide a support for the field core 117. The field core 117 is a metal member built up of a plurality of laminations or sheet metal plates 118 secured together by a plurality of rivets 119. The exact shape of the field core laminations or plates may be varied, but I prefer to form these plates so that the core will have external cylindrical surface 120 adapted to engage the inner edges of the ribs 115.

The laminations 118 are also formed with a centrally located opening 121 and with cut outs 122 adapted to receive the field windings 123. The cut outs 122 separate the aperture 121 into two separate pole pieces 124 and 125, and the cut outs also form slots 126 for receiving the field winding coils 123. The field coils 123 may be of conventional form, being covered with tape and forced into the tapered slots 126 within an insulating cover 127 of paper or fiber, so that the field core and its windings may be assembled as a unit with the casing 97.

The laminations 118 may be formed with a small slot 129 on each of the sides at approximately the middle of the coils, and the coils may be retained within their slots by a cord looped about the top and bottom of the coil and extending outside of the laminations within the slot 129.

The ribs 115 provide a means for support-

ing the core 117 in spaced relation from the casing, forming ventilation conduits 128 extending outside of the field core 117 and completed by the air gap 121.

Casing 97 is also formed with a pair of diametrically opposite inwardly extending lugs 130 and 131 located midway between two pairs of ribs 115 and the lugs 130, 131 may be provided with bores 132 and 133 adapted to receive the brush mechanism for the motor. The lugs 130 and 131 are also provided with downwardly extending protuberances 134 and 135 against which the field core 117 may also rest, and the protuberances 134 and 135 are provided with threaded bores 136 adapted to receive screw bolts 137 for securing the core within the casing.

The laminations 118 are also provided with slots 138 of substantially semi-circular shape and located to receive the bolts 137 so that the sides of the slots 138 engage the bolt 137 and prevent rotative movement of the core 117 in the casing.

The bolts 137 are preferably provided with elongated heads 139 having threaded bores 140 therein for the purpose of receiving the screw bolts 141 which secure the cover 104 on the casing 97. The cover 104 is of course provided with appropriate apertures 142 registering with the bores 140 when the cover is in proper position with the spring 96 projecting through the slot 112. The screw bolts 137 are each provided with a sheet metal clamping member 143 comprising a short strip of metal having an aperture to receive the bolt 137 and having an upwardly turned flange 144 located to engage just outside the core 117 on the cylindrical surface 120. The clamping members 143 greatly aid in assuring the permanent location of the core in the casing in such manner that the air gap will be maintained uniform.

The bores 132 and 133 in casing 97 are adapted to receive the tubular bakelite members 145 which are molded within a metal lining tube 146 secured therein. The bakelite tubes 145 are secured in the bores 132, 133 by transverse set screws 147 and the bakelite tubes are provided with annular shoulders 148 adjacent their outer ends for determining the final position of these members in spaced relation to a commutator 149.

The tubular metal lining 146 is threaded at its outer end 150 to receive a spring adjustment plug 151 having a socket 152 adapted to receive a helical coil spring 153. The tubular lining 146 is also provided with an internal bore 154 which is squared out by providing four right angled slots 155 extending longitudinally of the bore and the tubular metal lining 146 is thus adapted to slidably support a square block of carbon 156 which serves as the brush for the motor.

The carbon block 156 is formed with an outwardly extending pin 157 for retaining the helical spring 153 in proper position on the end of the brush and the opposite end of the brush is provided with a cylindrical surface complementary to the commutator 149. The inner end of the tubular metal lining or brush guide 146 is formed with an annular slot 158 which is adapted to receive the resilient sheet metal clamping arms 159 of a connector 160 which is secured to conductors 161 leading from one of the field coils and the brush guide also preferably carries a cardboard insulating shield 162 to prevent short circuiting between the contact 160 and brushes of the casings. Other conductors 163 and 164 leading from the field coils are permanently connected to the connector 165 which is secured inside the casing 97 by a pair of screw bolts 166 threaded into the bakelite block which forms the body of the connector 165.

The connector 165 comprises a block of bakelite which is provided with a pair of bores 167 adapted to slidably receive connector pins 168 having heads 169. The heads 169 are received in a counterbore 170 and slidably engaged by the walls of a tubular member 172. The head is also engaged by a helical spring 171 which is seated at its opposite end against the metal member 172 molded in the block 165.

The spring 171 biases the connector pins 168 outward so that they are adapted to resiliently engage the heads of the screw bolts 59 and 60 on the connector 57 carried by the standard. As both of the contact pins 168 are identical in construction, and as both of the motor brush structures are identical, only one of each of these members has been described in detail. The connectors 163 and 164, respectively, are permanently soldered to the metal members 172 and thereby respectively connected to the connector pins 168.

The motor circuit or circuit arrangement of the field windings is no feature of the present invention, and may consist of any conventional motor circuits, but the motor employed is preferably of the universal type adapted to operate on alternating or direct current. In order that the control circuit of the motor may be clearly disclosed, we shall trace the connections from the connector 165 through the switch 20 to the source of supply.

The connector pins 168 engage the screw bolts 59 and 60 which are in turn connected to conductors 63 and 64. The conductor 63 leads to the contact spring 31 which may be connected by the switch 20 through the contact 33 to the contact spring 32. The contact spring 32 is connected at its lower end to conductor 173 and the conductors 63, 173 constitute the leads which may be connected to the source of supply through the usual wall plugs.

One of the most important features of the

present invention lies in the provision of a motor and agitator shaft 174 which is constructed of a single unitary or integral piece of metal, and by constructing the shaft of an integral piece of metal, we are enabled to accurately machine this member so that it is perfectly aligned, and the agitator cannot be out of alignment with the motor shaft. As previously outlined above, where the agitator shaft is separate from the motor shaft and is secured to the motor shaft after both of these members have been manufactured, the agitator shaft is generally slightly out of alignment, causing some wobbling at the lower end of the agitator shaft, and causing vibration of the shaft during its rotation. These undesirable effects are entirely eliminated by the present construction, and the shaft 174 may be so accurately constructed that the device runs with a smoothness and noiselessness hitherto unknown in drink mixers.

The shaft 174 comprises a steel shaft which is provided with an armature 175 built up of a plurality of plates or laminations frictionally secured on the shaft 174. The laminations 175 may be forced on the shaft 174 under pressure by a heavy press, and the laminations may be of conventional form having a plurality of slots 176 provided with wider portions 177, forming pole pieces 178 and recesses for receiving armature coils 179. The armature is wound in the conventional manner for universal motors, preferably with armature wire insulated with varnish, and the armature coils 169 are retained in place by strips of insulating fiber 180 which are slid endwise into the recesses below the slots 176.

The terminals of the armature coils 179 are connected in the conventional manner to the segments 181 of a commutator 149 which comprises a plurality of copper strips having wedge shaped edges extending radially into a bakelite hub, in which the segments are permanently molded to secure them together and to secure the commutator on the shaft 174.

The commutator 149 with its bakelite hub may be molded on a brass tube 182 which is slid on the end of the shaft 174 and the shaft 174 may be provided with an end portion 183 of reduced diameter, forming an annular shoulder 184. The brass tube 182 may then be retained in place by forcing a steel ring 185 on the end 183 of the shaft 174, the ring 185 being one of the races for the anti-friction bearing 103.

In order that a reserve supply of lubrication may be placed about the anti-friction bearing 103, we provide the bore 99 with a cupped metal plate 186, and the cupped metal plate 186 is provided with a central aperture 187 adapted to receive the shaft 174. The cup of the metal plate 186 is also provided with an annular packing 188 retained in place by a metal plate 189 forced into frictional engagement with the walls of the cupped metal plate 186. The metal plate 186 may be secured at the inner end of the bore 99 by a plurality of screw bolts 190 and the plate 189 may support a second race ring 191. The race ring 185 is provided with a circumferentially extending circular groove 192, while the race ring 191 is provided with a groove 193, also of circular cross section, but so disposed as to resist axial thrust asserted upon the ring by the ball bearings 194.

In order to prevent rattling and to resiliently maintain the engagement between the ball bearings and race rings at all times, we provide the shaft 174 with a spring plate 195 engaging the end of the shaft, and a helical spring 196 seated in a cover 197 resiliently engages the spring plate 195. The lower end of the spring and the spring plate 195 may also be surrounded by a cupped annular member 198 for maintaining the spring in alignment with the spring plate and the cap 197 may be threaded into the bore 99. The cap 197 is preferably circular and merely provided with one or more sockets 199 adapted to be used with a special wrench for removing the cap so that the cap cannot be removed by unauthorized persons.

The extreme end of the protuberance 102 may be provided with a portion 200 of reduced diameter and a shoulder 201 adapted to receive a stamped curved metal cap 202 which is retained by frictional engagement with the end 200 and which lies flush with the external surface of the protuberance 102 at the shoulder 201. The casing is thus given a finished appearance and is sealed against tampering by unauthorized persons, and the space surrounding the spring 196 beneath the cap 197 may be filled with hard grease or other solid lubricant, which is retained within this chamber by virtue of the cupped plate 186 and packing 188.

The cover 104 may be provided with a bore 203 adapted to substantially fit the shaft 174 and with a counterbore 204 adapted to receive a packing 205. The packing 205 is secured in place by a metal plate 206 in frictional engagement with the walls of the counterbore 204 and the counterbore 204 communicates with a second counterbore 207.

In order to insure noiseless operation, the bottom of counterbore 207 is lined with a fiber washer 208 and the walls of the bore 207 are lined with a strip of fiber 209. The fiber washer 208 supports a steel race ring 210 having a groove 211 of circular cross section adapted to receive the ball bearings 212 and resist axial thrust thereon, while the shaft 174 is provided with a steel race ring 213 pressed on the shaft and having a circumferential circular groove 214.

Since the race rings 210 and 213 are provided with grooves of circular crosssection, it

will be evident that the shaft 174 may take a number of different axial positions with respect to the balls 193 and 212. The balls are guided by the grooves in the race rings, and assume a position which depends on the position of the race rings, and it is therefore not necessary to effect an exact alignment of the covers of the casing with each other, but alignment of the bearings is an inherent function of the anti-friction bearings used. Above the race rings 210, 213, the counterbore 207 is closed by a cupped metal plate 215 having a packing 216 secured by a packing plate 217 substantially the same as described with relation to the cupped plate 186 for the other bearing. The cupped plate 215 is secured in place by a plurality of screws 218 forming a chamber 219 about the anti-friction bearing, which may be filled with hard grease or other lubricant. Solid lubricant is preferably employed in order to assure a supply of lubricant for a long period of time.

The shaft 174 is also preferably provided with a fan 220 comprising a sheet metal plate having a plurality of twisted plates 221 and carried by a ferrule 222 which is secured to the shaft by a close frictional engagement therewith. The fan 220 is adapted to assure the circulation of the air through the air gap about the armature returning through the conduits 128 between the ribs 115 and the fresh supply of air may be drawn in through the openings 114, the warm air being exhausted through opening 113.

In order to assure the correct position of the cover 104 on the casing 97, one of the ribs 115 may project upward to be engaged in a slot carried by the cover 104.

The shaft 174 is preferably relatively thick and sturdy and constructed of the best steel, to prevent any possibility of the bending of a shaft during use or shipment, and the shaft may be tapered from its upper end to the lower end 223. At the lower end of the shaft 223 there is provided an agitator 224 consisting of a metal plate having a plurality of radial corrugations 225 and secured to the shaft by a screw bolt 226.

The operation of the present drink mixer is substantially the same as that described in the patent above mentioned, as the motor circuit is closed by the placing of the container on the container support 15 as previously described. Due to the improved construction of the present device, the operation of the mixer is extremely smooth and noiseless and the absence of vibration is noticeable in comparison with the mixers of the prior art. As the present construction greatly simplifies the assembly and manufacture of the drink mixer, the mode of assembly of various parts will be outlined as follows.

The switch 20 may be secured within the supporting head 14 after which the necessary electrical connectors may be secured to the switch and to the connector 57 carried by the supporting head. The supporting head 14 may then be slid into the standard 11 and secured by a screw bolt 227. In some embodiments, both the standard and the supporting head 14 are provided with slots 228 at the forward upper end of the standard to receive the container support 15, but it is only necessary to provide a slot in the supporting head 14.

The connector 57 may then be fixed in place in the supporting head 14 and the motor support 15 may be inserted with the stop member 73 in the hole 74. After the stop member 73 is satisfactorily inserted, the upper end of the supporting member 15 is located opposite the bore 83 and the screw bolt 51 inserted from the side to pivotally support the container supporting member 15.

In assembling the motor structure, the shaft and armature are preferably first assembled with the lower anti-friction bearing and cover 104, after which the armature may be inserted within the field core and the upper anti-friction bearing assembled about the upper end of the shaft 174. The anti-friction bearing employed is preferably of the type having the ball bearings resiliently held in place by an annular sheet metal ring so that the balls may be sprung on and off of the rings 185, 213 without disassembling each ball from the ring.

During the process of assembly, the anti-friction bearing chambers are filled with solid lubricant, and the upper bearing is provided with a spring for maintaining the race rings in resilient engagement with the ball bearings.

The entire motor assembly may then be secured to the motor supporting head 14 by means of a plurality of screws 23 at which time the connector pins 168 will be automatically connected with the bolts on the connector 57. It should be noted that these elements are not properly switch elements, but merely connectors, since they are not intended to make and break a circuit, but merely to perform the function of connection. When the motor casing is assembled with the supporting head 14, the leaf spring 96 is also brought into engagement with the latch 66 of the container supporting member 15.

It will thus be observed that we have invented a novel drink mixer assembly which is more easily assembled and more economically manufactured than the drink mixers of the prior art and the present improved construction of drink mixer is adapted to give satisfactory service for a long period of time without attention for lubrication or any other purpose. The improved construction of the agitator and motor shaft facilitates the provision of an agitaor in perfect alignment with the motor shaft and use of anti-friction bear-

ings also greatly contributes to the smooth running qualities of the improved machine.

While we have illustrated a preferred embodiment of our invention, many modifications may be made without departing from the spirit of the invention, and we do not wish to be limited to the precise details of construction set forth, but desire to avail ourselves of all changes within the scope of the appended claims.

Having thus described our invention, what we claim is new and desire to secure by Letters Patent of the United States, is:

1. In a drink mixer, a motor construction, comprising a motor casing, having a bore in one end, a closure for the other end and a bearing carried by said closure, an antifriction bearing mounted in said bore, a cupped member for supporting said antifriction bearing, a packing carried by said cup, a plate frictionally engaged in said cupped member to secure said packing and an integral rigid motor and agitator shaft carried by said bearings.

2. In a drink mixer, a motor construction, comprising a motor casing, having a bore in one end, a closure for the other end and a bearing carried by said closure, an antifriction bearing mounted in said bore, a cupped member for supporting said antifriction bearing, a packing carried by said cup, a plate frictionally engaged in said cupped member to secure said packing, an integral rigid motor and agitator shaft carried by said bearings, said bearings being thrust bearings and resilient means in said bore for biasing said shaft into engagement with said thrust bearings.

3. In a drink mixer, the combination of a hollow metal standard with a switch mounted in said standard, a metal motor support head mounted in the upper end of said standard, and a container supporting member pivotally mounted in said head and adapted to actuate said switch.

4. In a drink mixer, the combination of a hollow metal standard with a switch mounted in said standard, a metal motor support head mounted in the upper end of said standard, a container supporting member pivotally mounted in said head and adapted to actuate said switch, said container supporting member comprising a pivoted lever and a container engaging member slidably mounted thereon to engage the top of a container.

5. In a drink mixer, the combination of a hollow metal standard with a switch mounted in said standard, a metal motor support head mounted in the upper end of said standard, a container supporting member pivotally mounted in said head and adapted to actuate said switch, said container supporting member comprising a pivoted lever, a container engaging member slidably mounted thereon to engage the top of a container, a motor carried by said head, and a spring carried by said motor to bias said engaging member into engagement with a container.

6. In a drink mixer, the combination of a hollow metal standard with a switch mounted in said standard, a metal motor support head mounted in the upper end of said standard, a motor carried by said head, a leaf spring carried by said motor, a container supporting lever pivotally mounted in said head, and a latch carried by said lever, said spring engaging said latch.

7. In a drink mixer, the combination of a support with a motor carried thereby, said motor being provided with a pair of spaced thrust bearing races, an integral motor and agitator shaft rotatably mounted in said motor and provided with a pair of spaced races for receiving ball bearings, said shaft being slidably mounted relative to said first mentioned races, ball bearings in said races and resilient means carried by said motor for axially urging said shaft into position to maintain said balls in said races.

8. In a drink mixer, the combination of a motor having an elongated agitator shaft with a hollow standard for enclosing electrical connections, a head carried by said standard and having laterally extending flanges for engaging said motor casing, said head having a transverse bore, connector contacts carried by said motor casing and fixed contacts carried by said head, a container supporting member pivotally mounted upon said head, and a spring carried by said motor for engaging said container support.

9. In a drink mixer, the combination of a hollow standard, with a removable supporting head carried thereby, a mixer motor mounted on said supporting head, said supporting head being formed with a socket, an insulating body adapted to be fixedly secured in said socket and having a pair of connector members on the outer surface of said insulating member, and said motor having a pair of resilient connector members electrically connected to said motor for engagement with the first mentioned connector members.

10. In a drink mixer, the combination of a hollow standard, with a removable supporting head carried thereby, a mixer motor mounted on said supporting head, said supporting head being formed with a socket, an insulating body adapted to be fixedly secured in said socket and having a pair of connector members on the outer surface of said insulating member, said motor having a pair of resilient connector members electrically connected to said motor for engagement with the first mentioned connector members, a pivoted container support carried by said supporting head, and a switch for said motor carried by said standard.

11. In a drink mixer, the combination of a hollow standard, with a removable sup-

porting head carried thereby, a mixer motor mounted on said supporting head, said supporting head being formed with a socket, an insulating body adapted to be fixedly secured in said socket and having a pair of connector members on the outer surface of said insulating member, said motor having a pair of resilient connector members electrically connected to said motor for engagement with the first mentioned connector members, a pivoted container support carried by said supporting head, a switch for said motor carried by said standard, a container securing member slidably mounted on said lever, and a spring carried by said motor for urging said securing member into securing position.

In witness whereof, we hereunto subscribe our names this 2nd day of January, 1929.

RUSSELL A. BLISH.
ARTHUR P. JORGENSON.