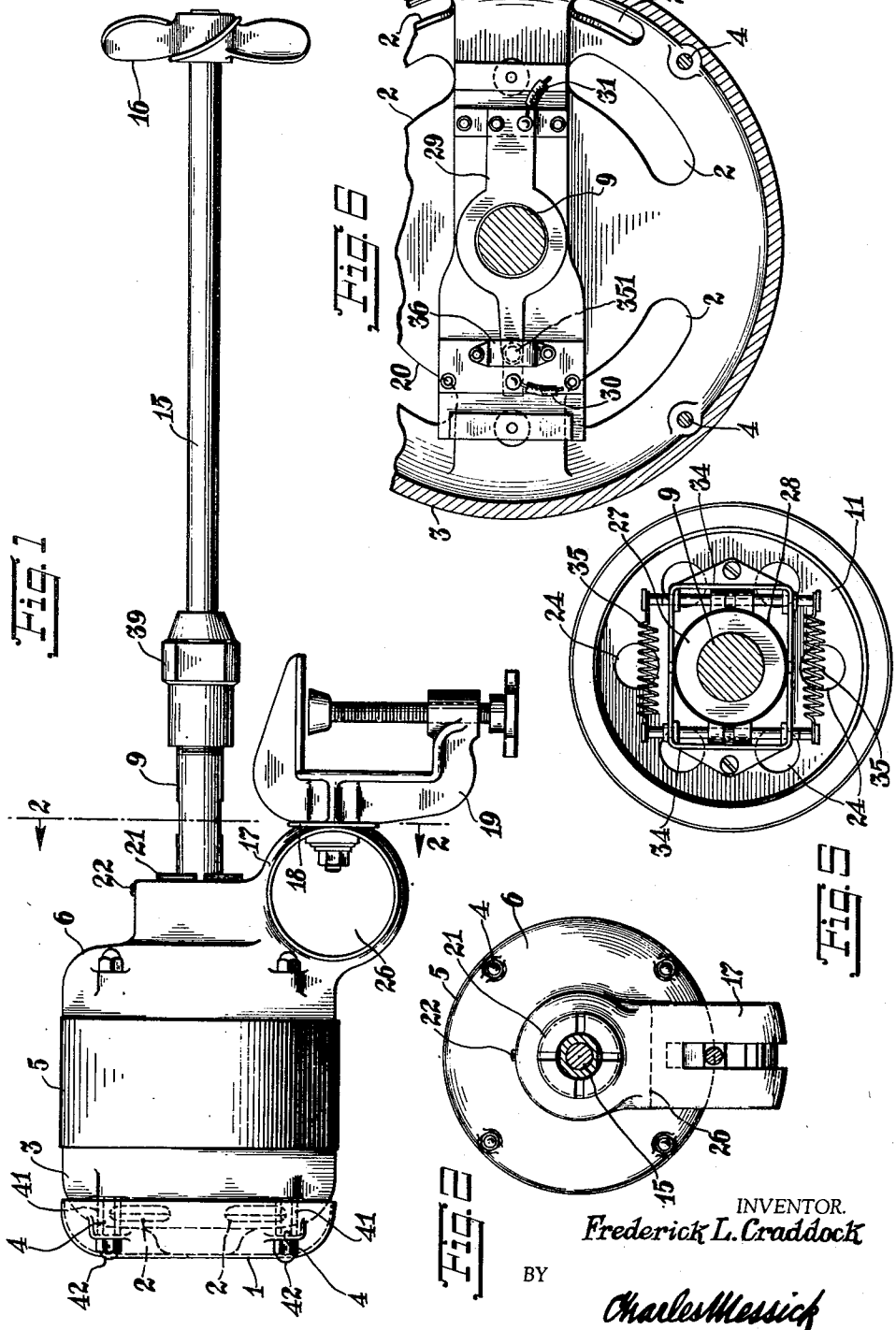
Dec. 17, 1935. F. L. CRADDOCK 2,024,340

TELESCOPIC ROTOR AGITATOR

Filed Feb. 9, 1935 2 Sheets-Sheet 1



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Fig. 4

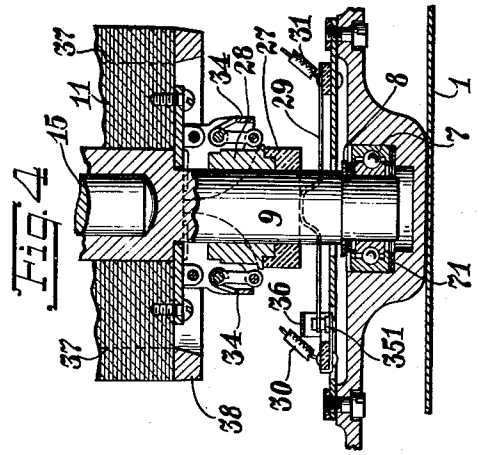


Fig. 3

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TELESCOPIC ROTOR AGITATOR

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10 Claims. (Cl. 259—103)

This invention is an improvement on the Mixing devices described in my Reissue Patent No. 17,683 and pertains to the class of mixing devices shown therein, in patents to Grigsby, No. 1,615,875; Mitchell, No. 1,449,051, etc.

The object of this invention is to improve mixers. Another object of this invention is to reduce the number of special parts in mixers to a minimum. Another object is to arrange for perfect alignment and efficient operation of mixers by improved arrangement and design of the parts. Other objects are to limit the headroom required by the motor so as to facilitate operation in cramped locations above tanks, etc., and to provide a stuffing box integral with the lower end bracket of the motor.

Other objects may appear in the following detail description of a preferred construction and may be pointed out in the appended claims.

Referring to the accompanying drawings:—

Fig. 1 is a side elevation of the preferred form of my complete portable agitator or mixer. The mixer is shown horizontal to enable the parts to appear on a large scale, but in operation the motor at the left of Fig. 1 is clamped to the edge of a tank in a conventional manner and the propeller at the right of Fig. 1 extends down into the tank as is the case with all devices of this general class.

Fig. 2 is a bottom view taken on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged longitudinal section of the part of the device shown at the left of Fig. 1.

Fig. 4 is a fragmentary longitudinal section taken on the line 4—4 of Fig. 3. The parts shown at the left of Fig. 3 appear at the bottom of Fig. 4.

Fig. 5 is a section taken on the line 5—5 of Fig. 3 looking to the right and Fig. 6 is a similar section taken on the line 6—6 looking to the left. Lines 5—5 and 6—6 are coextensive.

Referring particularly to Fig. 3 in which assembly of the improved and novel features of the device are shown, numeral 1, at the left of the figure shows a top cover for the mixer motor which is designed to prevent the entrance of splashes of liquid into the cooling air intake ports 2. The member 1 is also useful as a shield against grit or other floating particles which might enter the intake ports 2. Cover 1 is mounted on the upper end bracket 3 and secured in place by bolts 4 having suitable spacer nuts 41 and castle nuts 42, shown best in Figs. 1, 6, etc. Bolts 4 also act to hold together the several parts of the motor including shield 1, upper end bracket 3, yoke 5 and lower end bracket 6. End bracket 3 is provided with a recess containing a ball bearing 7 backed by assembly adjustment shims 71. Bearing 7 is designed to sustain both upward thrust and radial thrust. There is also provided an oil catching ring 8 which is designed to prevent oil or grease dropping down into the motor from the bearing 7. Members 3, 5 and 6 may be considered as forming the motor casing.

Referring to Fig. 3 again it will be noted that the motor shaft 9 where it extends from bearing 7 to the rotor laminations 11, is of normal diameter, but that at the edge of the laminations 11 its diameter increases and it extends downwardly through the rotor laminations 11 to the shoulder 12 and assembly adjustment shim 13. Shim 13 is used to position the thrust and radial thrust bearing 14 on shaft 9. This bearing 14 sustains upward thrust from the propeller shaft 15 and the propeller 16 shown in Fig. 1. Lower end bracket 6 extends to and forms the ball 17 of the ball and socket joint 17—18 best shown in Fig. 1. The socket 18 is formed on the upper portion of the clamp 19 which in turn is designed to be clamped upon the upper edge of a tank in a conventional manner.

It will be observed that by thus combining the lower end bracket 6 with the ball 17 a very simple and effective structure is provided and one which conveniently receives the stuffing box including the stuffing 20, and follower 21. Follower 21 is threaded into a suitable threaded hub portion of member 6. Follower 21 is adjustably locked in position in member 6 by the headless set screw 22.

It will be noted that this stuffing box comprising members 20 and 21 prevents the possibility of oil or grease from bearing 14 falling into a tank in which the mixer may be operating. The arrangement just described includes only three parts, namely the stuffing 20, the follower 21 and the set screw 22, to accomplish this important safe guarding of the mix from possible contamination by dripping particles of oil or grease. It will also be noted that both bearings 7 and 14, by the arrangements above described, are compelled to leak inwardly of the motor, if at all, and thus completely prevent the possible contamination of a mix by the dripping of oil.

Upon motor shaft 9 is mounted a centrifugal blower fan 23, which is designed to suck air in through the intake ports 2, through the holes 24 in the rotor laminations 11 and discharge same through the openings 25 and 26 in the ball 17.

Thus the cooling air is discharged in such a manner as to flow outside of the tank upon which the mixer is mounted and prevent any particles which might be contained in the motor, from being blown into any mixing tank upon which the mixer happens to be mounted.

The motor illustrated in the drawings is what is known as a single phase motor and it is provided with a conventional split phase starting device of conventional design and proportions with respect to horsepower of the motor. Retaining the conventional proportions in the starting device is made possible by reducing the diameter of shaft 9, at the left of the laminations 11 as shown in Fig. 3. This permits the conventional sliding sleeve 27—28 to have a comparatively small bore in proportion to its length and consequently to slide parallel to the axis of the rotation of the shaft 9. The sleeve 27—28 comprises a metal portion 28 upon which is mounted an insulation portion 27, the two members 27—28 being permanently assembled so as to move and slide on shaft 9, as a unit. At the left of member 27 there is indicated a spring contact 29 which completes a circuit between the wires 30 and 31 in the indicated position. Wires 30 and 31 extend to the stator windings 32 and 33. The extensions are not shown, but the wires are indicated in Fig. 3. The motor starting device, per se, above described, is conventional.

As the motor starts, the centrifugal weights 34, which are shown as being held in the indicated position by the springs 35, tend to fly out centrifugally. When the speed of rotation becomes high enough for them to fly out the conventional attached linkage causes the sleeve 27—28 to move to the right according to Fig. 3 and this permits spring 35 to move upwardly according to Fig. 4 and break the circuit between wires 30 and 31 at contact 351. Contact 351 rests against the stop 36 as long as the motor speed remains high. The motor operates as a straight single phase induction motor as soon as contact at 351 is broken. It may be observed that the centrifugal weights 34 and the sleeve 27—28 and associated devices are in themselves coventional, but that in order to avoid their size becoming two large and unwieldy to be contained in a normal end bracket such as 3 it is necessary to reduce the diameter of the shaft 9 where it extends to the left of the laminations 11 and it is important that the end bracket 3 should be limited in size in order that the device may not occupy excessive head room and be cumbersome. Quarters are frequently cramped where mixers such as these are compelled to operate and thus it is desirable that they should be low. It may be observed that laminations 11 are provided with windings of the conventional induction motor type consisting of aluminum conductors indicated in dotted lines in Fig. 3 by the numeral 37 and terminating in the aluminum rings 38. Both members 37 and 38 and their arrangement are conventional.

Referring to the right of Fig. 3, it will be noted that the chuck 39 is threaded upon shaft 9 in a conventional manner and that the bore in shaft 9 is designed to receive propeller shaft 15 which may extend through most of the axial portion of the motor, thus giving maximum telescopic adjustability to shaft 15 in shaft 9. The overall dimensions of the motor and particularly the head room occupied, need not exceed those of a conventional motor of the same horsepower, thus producing a highly efficient mixer, because of the special arrangements above described. Where direct current is used the motor size may also be kept small by using the same kind of shaft as shaft 9 for it is desirable to keep the commutator in a direct current motor as small in diameter as possible and of standard proportions.

The expression "stuffing box" whereever it appears in the specification and claims is intended to include any form of oil seal and various changes in other details may be made in accordance with the progress of the art without departing from the spirit of this invention.

I claim:—

1. A mixing device provided with a motor having a lower end bracket, adjustable mounting means integral therewith, two bearings for the motor, an upper and a lower, said motor having a shaft, hollow where it extends through the lower bearing, to receive a propeller shaft and being of reduced diameter at its upper portion, a slidable sleeve thereon and centrifugal means to slide same after starting, a starting switch, said sleeve and means forming instrumentalities whereby said starting switch is automatically controlled.

2. An agitator including an alternating current motor having a casing and provided with a laminated rotor, a motor shaft therein of large diameter and hollow from the laminations of the rotor downward, provided with chuck means at its lower end and designed to receive a mixing shaft, an automatic starting switch at its upper end, said motor shaft being of normal diameter from the laminations of the rotor to its upper end whereby said automatic starting switch of minimum standard length may be mounted thereon and an end bracket at the lower end of the motor casing including a support for the agitator integral therewith.

3. A portable mixer including a motor casing provided with a lower end bracket, mounting means integral therewith forming part of a universal joint designed to adjustably support the mixer, a rotor having a hollow shaft for the motor, provided with an electromagnetic portion mounted upon and surrounding the shaft and chuck means on the lower end of said shaft for a mixing shaft, the hollow portion of said shaft extending into said electromagnetic portion of said rotor, whereby said mixing shaft may adjustably extend into and through the electromagnetic portion.

4. A portable mixer including a motor having a casing provided with upper and lower end bracket units, said lower end bracket unit being provided with a bearing at its lower end for a hollow motor shaft, mounting means at the lower end bracket unit forming part of a universal joint to adjustably support the mixer, a hollow motor shaft revolvably mounted in said lower bearing, a hollow portion of said shaft being surrounded by said lower bearing, the hollow portion of said shaft extending downwardly from said lower bearing and being provided with chuck means at its lower end, said shaft also extending upwardly from said bearing, through the body of the motor and being revolvably mounted in an upper motor shaft bearing in the upper end bracket unit.

5. A portable mixer having a motor including a casing provided with upper and lower end bracket units, said lower end bracket unit being provided with a bearing at its lower end for a hollow motor shaft, mounting means at the lower end bracket unit forming part of a universal joint to adjustably support the mixer, a hollow motor shaft re-

volvably mounted in said lower bearing, a hollow portion of said shaft being surrounded by said lower bearing, the hollow portion of said shaft extending downwardly from said lower bearing and being provided with chuck means at its lower end, said shaft also extending upwardly from said bearing, through the body of the motor and being revolvably mounted in an upper motor shaft bearing in the upper end bracket unit, said motor shaft being of reduced diameter and solid at its upper end whereby a starting switch may be accommodated and a starting switch provided with mechanism surrounding said reduced diameter portion.

6. A portable mixer including a motor having a casing provided with upper and lower end bracket units, said lower end bracket unit being provided with a bearing at its lower end for a hollow motor shaft, mounting means at the lower end bracket unit to adjustably support the mixer, a hollow motor shaft revolvably mounted in said lower bearing, a hollow portion of said shaft being surrounded by said lower bearing, the hollow portion of said shaft extending downwardly from said lower bearing and being provided with chuck means at its lower end, said shaft also extending upwardly from said bearing, through the body of the motor and being revolvably mounted in an upper motor shaft bearing in the upper end bracket unit, said motor shaft being of reduced diameter and solid at its upper end whereby a starting switch may be accommodated and a starting switch provided with mechanism surrounding said reduced diameter portion.

7. A portable mixer including a motor having a casing provided with upper and lower end bracket units, said lower end bracket unit being provided with a bearing at its lower end for a hollow motor shaft, mounting means at the lower end bracket unit forming part of a universal joint to adjustably support the mixer, a flat shoulder at the upper end of said lower end bracket unit at right angles to the axis of said bearing, a centering cylindrical portion adjoining said shoulder, assembly bolt holes at said shoulder, a hollow motor shaft revolvably mounted in said lower bearing, a hollow portion of said shaft being surrounded by said lower bearing, the hollow portion of said shaft extending downwardly from said lower bearing and being provided with chuck means at its lower end, said shaft also extending upwardly from said bearing, through the body of the motor and being revolvably mounted in an upper motor shaft bearing in the upper end bracket unit.

8. A portable mixer including a motor having a casing provided with upper and lower end bracket units, said lower end bracket unit being provided with a bearing at its lower end for a hollow motor shaft, mounting means at the lower end bracket unit, connecting means, designed for attachment to a tank, secured to said mounting means to support the mixer, a hollow motor shaft revolvably mounted in said lower bearing, a hollow portion of said shaft being surrounded by said lower bearing, the hollow portion of said shaft extending downwardly from said lower bearing and being provided with chuck means at its lower end, said shaft also extending upwardly from said bearing, through the body of the motor and being revolvably mounted in an upper motor shaft bearing in the upper end bracket unit.

9. A portable mixer including a motor having a casing provided with upper and lower end bracket units, said lower end bracket unit being provided with a bearing at its lower end for a hollow motor shaft, mounting means at the lower end bracket unit, adjustable connecting means, designed for attachment to a tank, secured to said mounting means to support the mixer, a hollow motor shaft revolvably mounted in said lower bearing, a hollow portion of said shaft being surrounded by said lower bearing, the hollow portion of said shaft extending downwardly from said lower bearing and being provided with chuck means at its lower end, said shaft also extending upwardly from said bearing, through the body of the motor and being revolvably mounted in an upper motor shaft bearing in the upper end bracket unit.

10. A portable mixer including a motor having a casing provided with upper and lower end bracket units, said lower end bracket unit being provided with a bearing at its lower end for a hollow motor shaft, mounting means at the lower end bracket unit, adjustable clamp, connecting means, designed for attachment to a tank, secured to said mounting means to support the mixer, a hollow motor shaft revolvably mounted in said lower bearing, a hollow portion of said shaft being surrounded by said lower bearing, the hollow portion of said shaft extending downwardly from said lower bearing and being provided with chuck means at its lower end, said shaft also extending upwardly from said bearing, through the body of the motor and being revolvably mounted in an upper motor shaft bearing in the upper end bracket unit.

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