

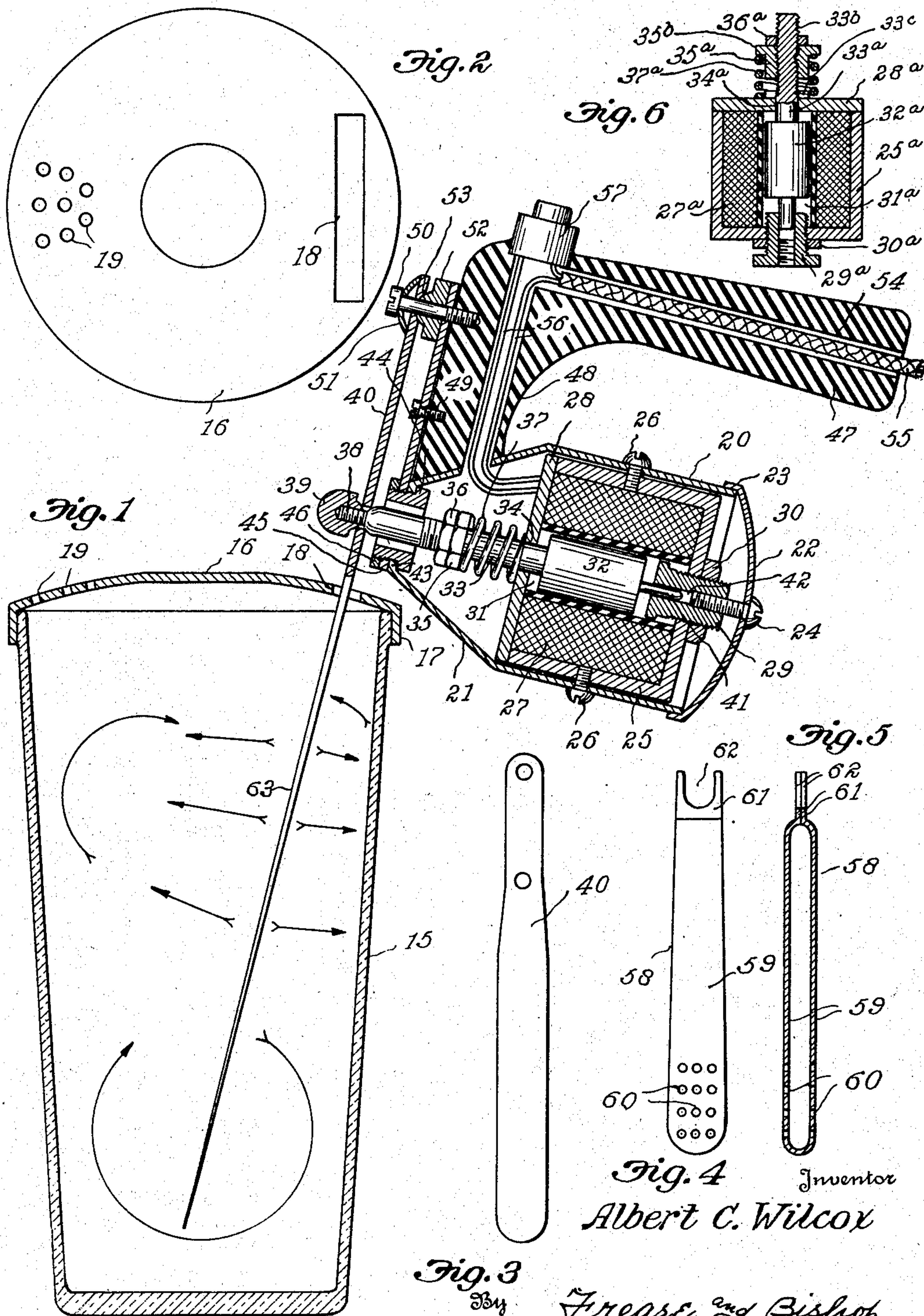
March 6, 1951

A. C. WILCOX
VIBRATING DRINK MIXER

2,543,818

Filed July 24, 1945

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

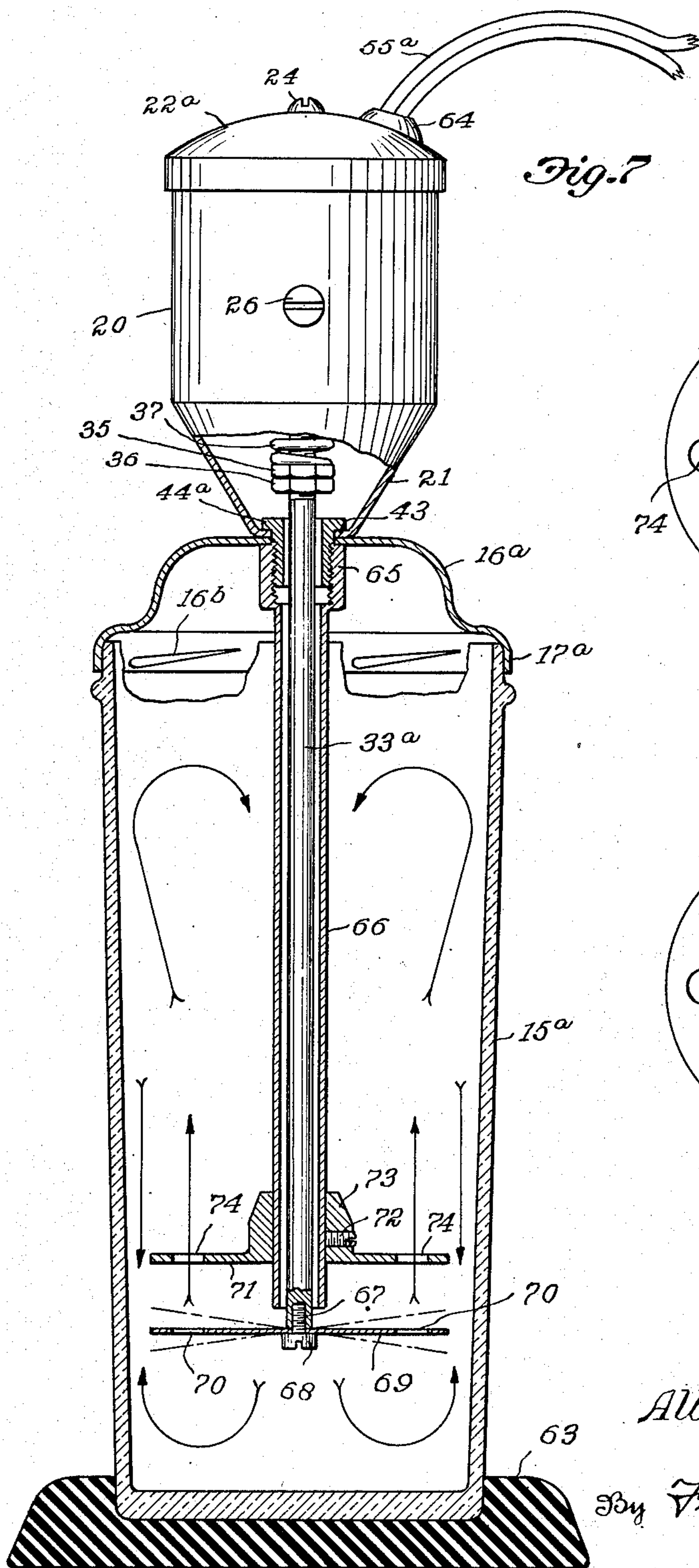


Fig. 7

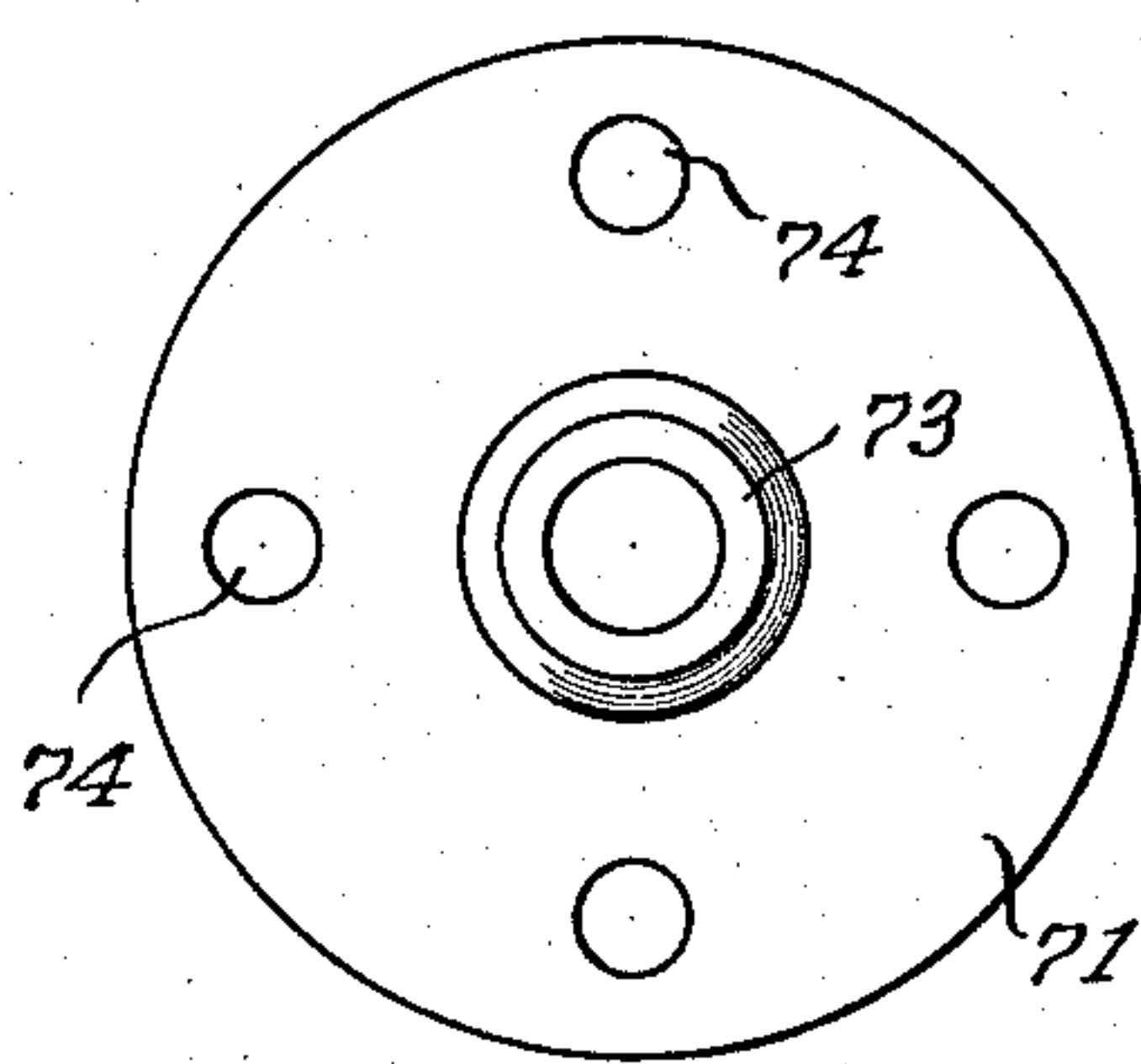


Fig. 9

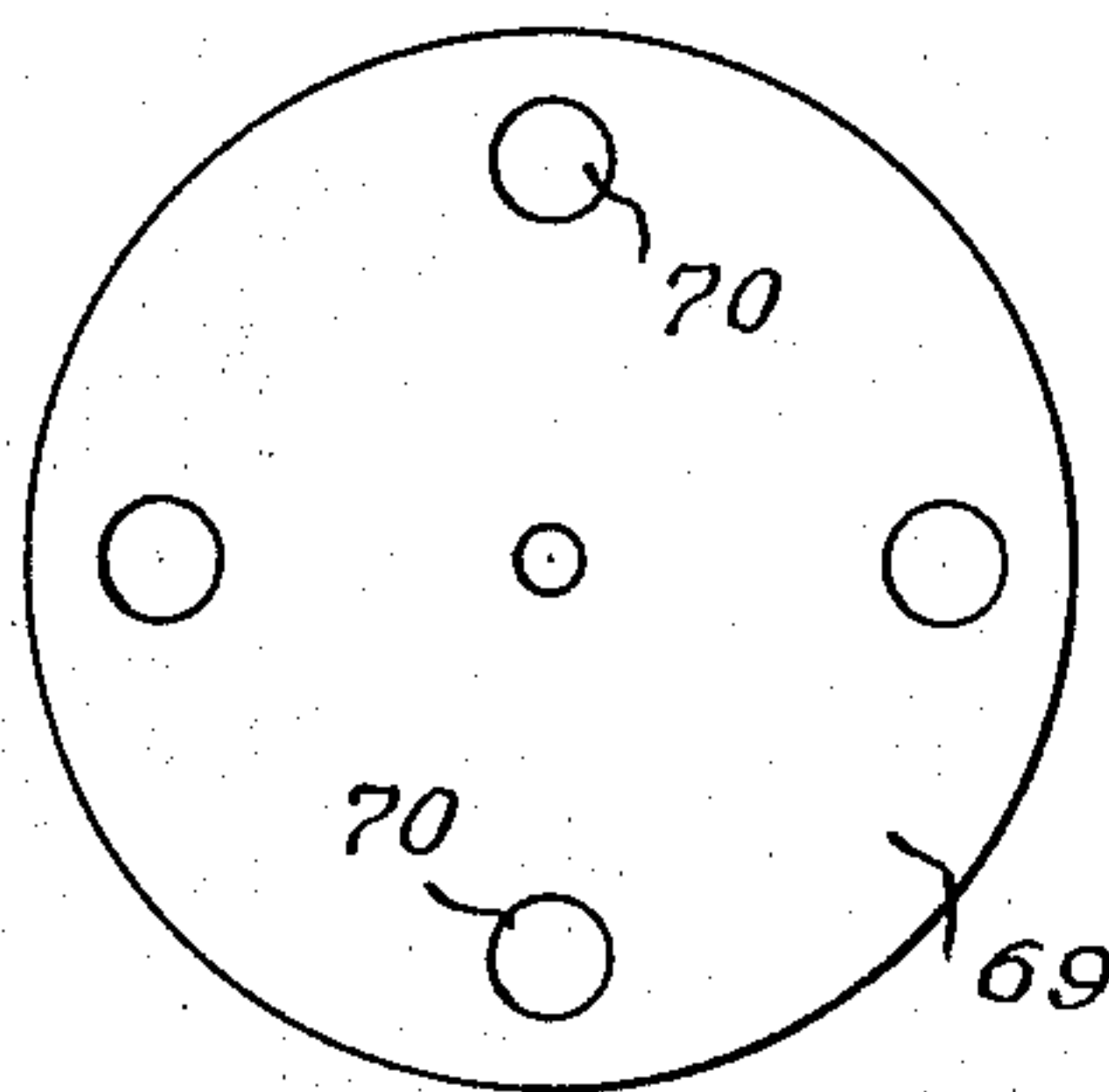


Fig. 8

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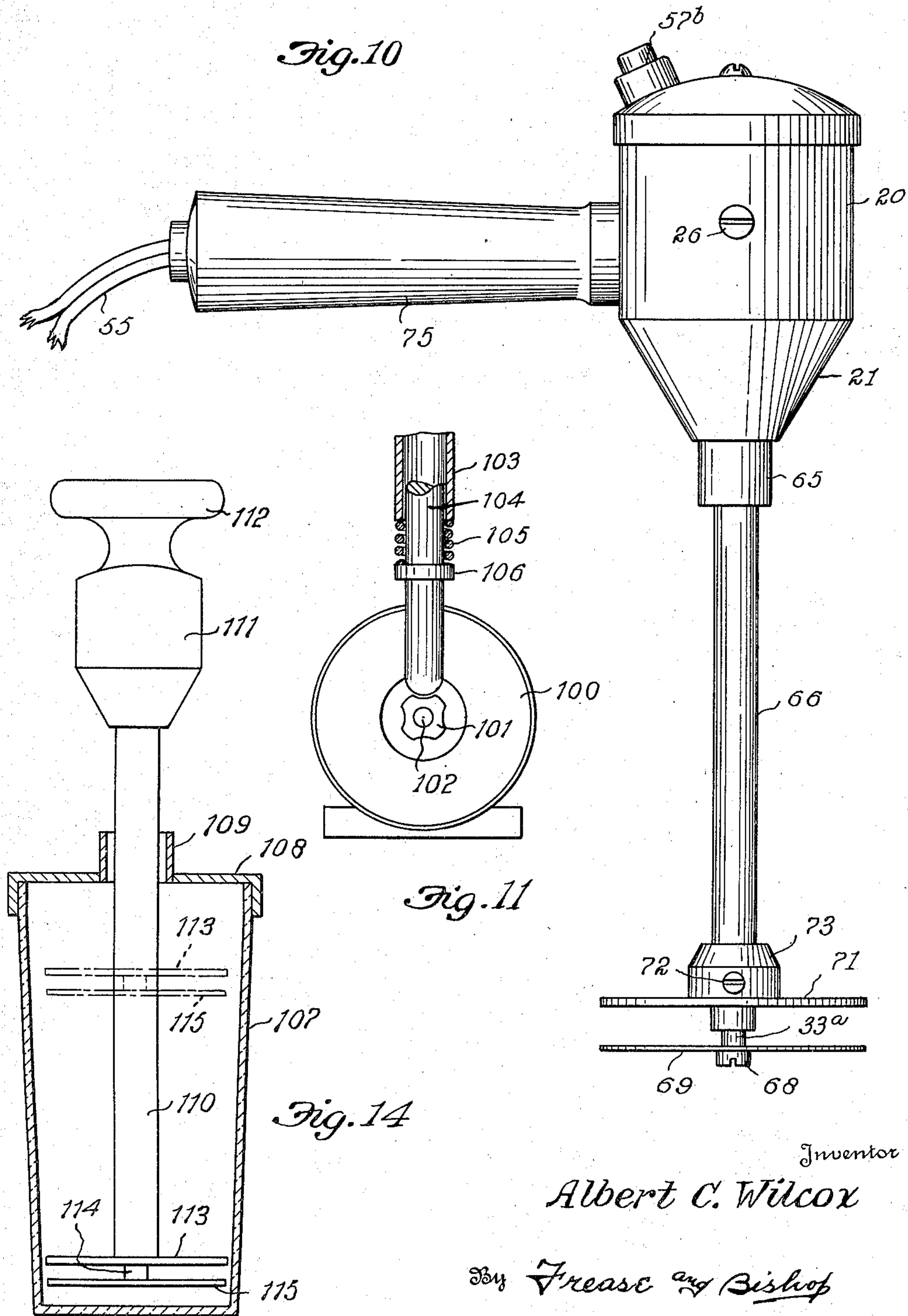
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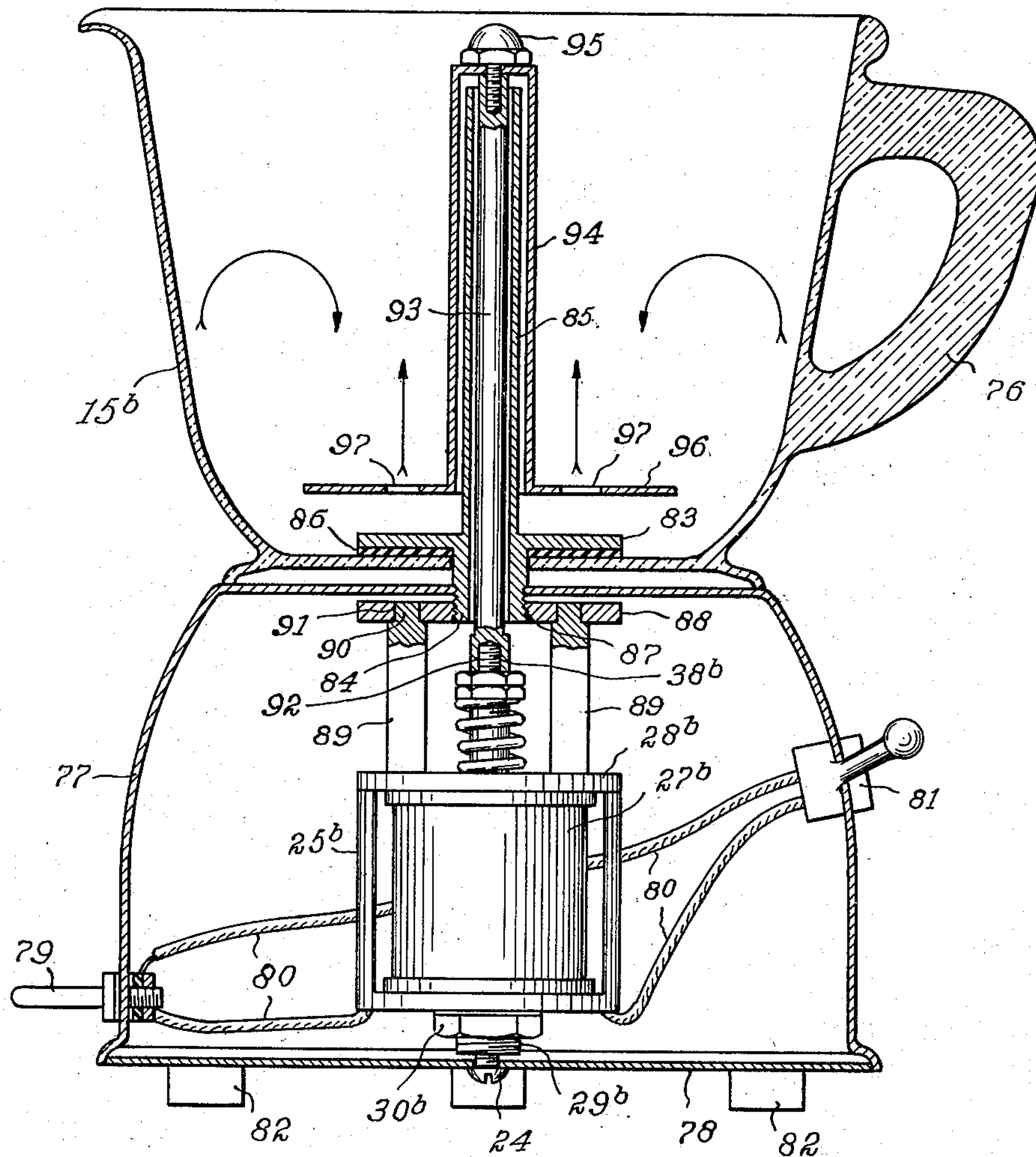


Fig. 12

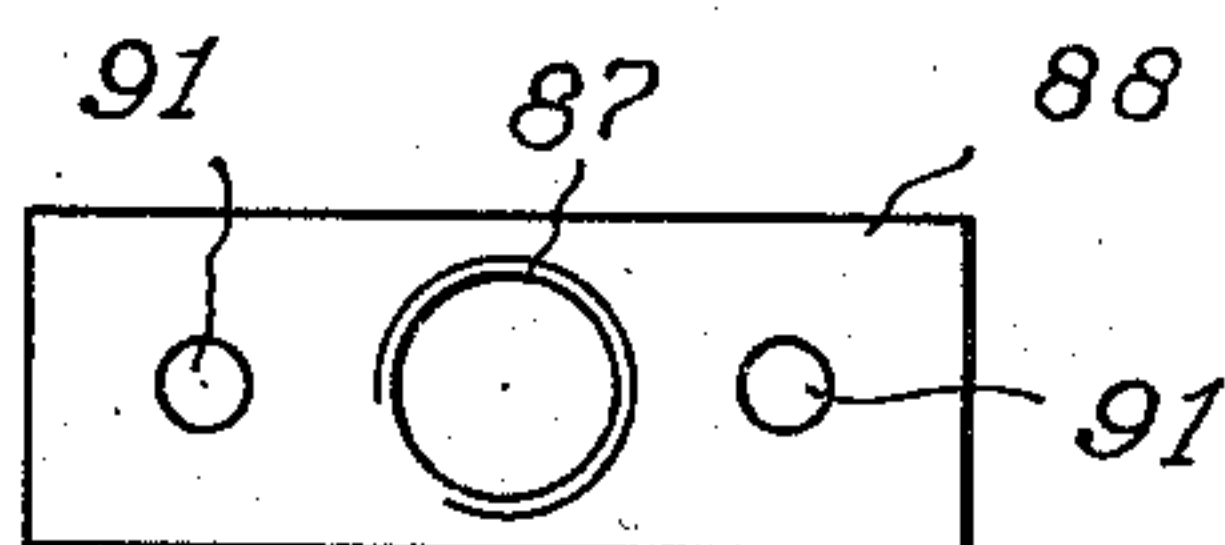


Fig. 13

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UNITED STATES PATENT OFFICE

2,543,818

VIBRATING DRINK MIXER

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Application July 24, 1945, Serial No. 606,853

2 Claims. (Cl. 259—113)

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The invention relates to mixers for mixing liquids and the like and more particularly to a device of this character having a rapidly vibrating tool in the form of a thin blade or disc with means for vibrating the tool within the liquid.

The object of the invention is to provide a mixer for liquids and the like comprising an electric magnet or similar device for vibrating a thin flexible tool within a container holding the liquid to be mixed.

Another object is to provide a device of this character including an electric magnet or other device for producing rapid vibratory motions of a thin flexible disc operatively connected to the vibrating means.

A further object is to provide a device of this character in which a relatively stationary, rigid perforate disc is located within the container in spaced relation to the vibrating disc.

A still further object of the invention is to provide a device of this character in which a special container is provided for the liquid to be mixed and the mixing device per se is carried upon the cover or lid of the container.

Still another object is the provision of a mixing device which may be used to mix liquids or the like in any bowl or other container and in which the spaced discs are supported upon the electric magnet or other vibrating device and a handle is provided upon the magnet for manually operating the device.

Another object is the provision of a mixing device of this character in which a long flexible blade is connected at its upper end to the head of the device and is operatively connected at a point spaced from its upper end to the electric magnet or other vibrating mechanism.

A further object is the provision of a mixer in which the magnet or other electric unit for producing vibratory motion of the mixing tool is located within a housing mounted beneath the container in which the mixing is accomplished.

The above objects together with others which will be apparent from the drawings and following description, or which may be hereinafter referred to, may be attained by constructing the improved mixer in the manner illustrated in the accompanying drawings, in which:

Figure 1 is a vertical sectional view through a drink mixer embodying the invention showing the mixing tool in the form of a vibratory blade;

Fig. 2, a top plan view of the cover for the liquid container shown in Fig. 1;

Fig. 3, an elevation of the vibratory blade shown on a smaller scale;

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Fig. 4, an elevation of an auxiliary blade which may be attached to the flexible blade of the mixer;

Fig. 5, a longitudinal sectional view through the auxiliary blade shown in Fig. 4;

Fig. 6, a longitudinal sectional view through a modified form of magnet for vibrating the blade;

Fig. 7, a vertical sectional view through a form of the device provided with a vibrating disc and a spaced stationary disc, the vibrating mechanism and electric unit being carried by the cover for a specially designed container for the liquid to be mixed;

Fig. 8, a plan view of the flexible vibratory disc;

Fig. 9, a plan view of the rigid stationary disc;

Fig. 10, an elevation of a portable disc mixer of the same general type as shown in Fig. 7, adapted for use in any bowl or container;

Fig. 11, a modification of the mixer shown in Figs. 7 and 10 in which the vibrations are produced by a motor and cam wheel;

Fig. 12, a vertical sectional view through a deluxe form of the disc mixer in which the magnet is located within a housing forming a base for the container in which the disc is vibrated;

Fig. 13, a detached view of the binding plate from which the magnet is suspended; and,

Fig. 14, a modification of the mixer shown in Fig. 7.

In the form of the invention illustrated in Figs. 1 to 5 inclusive a vibrating blade type of mixer is shown as a portable type of mixer which is adapted to be held in the hand to operate the vibrating blade within a container holding the liquid or the like to be mixed.

While any bowl or other container may be used for this purpose the container indicated at 15 is preferably provided. This container may be formed of glass, metal or other suitable material and is preferably of substantially the shape of a glass tumbler and may be provided with a lid as indicated at 16.

This lid may be formed of metal or other suitable material and is provided with a rim flange 17 arranged to fit tightly upon the upper open end of the container 15. A slot 18 is provided near one edge of the cover to accommodate the vibrating blade and if desired perforations as indicated at 19 may be formed in the cover.

The electric unit for producing the vibratory motion of the blade is shown as an electromagnet enclosed within a substantially cylindric shell 20 which may be formed of sheet metal or

other suitable material. One end of the shell may be of conical or tapered form as indicated at 21, and provided with a central aperture through which the armature is adapted to reciprocate, as will be later described.

The other end of the shell may be closed by means of the cover or lid 22 having a peripheral flange 23 fitting over the open end of the shell, and is arranged to be held in position upon the shell by means of the screw 24.

The magnet includes the U-shape pole piece 25, formed of soft iron or the like, and connected to the shell 20 as by the screws 26. The magnet coil or solenoid 27 is mounted within the pole piece 25 and the cross member 28 is attached to the ends of the yoke or pole piece 25.

The adjusting screw 29 is threaded through the top of the yoke or pole piece 25 and a lock nut 30 is provided thereon for holding the screw in adjusted position. This adjusting screw is internally threaded to receive the screw 24 which holds the cover 22 upon the shell.

The magnet coil 27 has a central longitudinal opening 31 within which the reciprocating armature 32 is mounted for sliding movement. This armature has the reduced extension 33 slidably located through the aperture 34 in the cross piece 28, and an adjusting nut 35 and lock nut 36 are mounted thereon at a point spaced from the cross member, a compression spring 37 being located around the reduced extension 33 of the armature, between the cross member 28 and the nut 35 so as to normally urge the armature outward against the pull of the magnet.

A further reduced, threaded extension 38 may be formed upon the end of the reduced extension 33 for receiving the rounded locking nut 39 by means of which the blade 40 is operatively connected to the armature.

A brass pilot pin 41 is centrally located upon the other end of the armature 32 and arranged to slide within the central opening 42 in the adjusting screw 29.

The open end of the conical extremity 21 of the shell terminates in the inturned flange 43 against the inner side of which is located the enlarged head of the threaded binding stud 44, the binding plate 45 being clamped against the other side of said flange by means of the lock nut 46.

The handle 47 may be formed of plastic or other suitable material and is provided with the angular portion 48 attached to the conical extremity 21 of the shell in any usual and well known manner, and preferably is located substantially parallel to the shell and spaced therefrom a sufficient distance to permit the handle to be grasped in one hand.

The binding plate 45 may be attached to the angular extension 48 of the handle as by the attaching screw 49, and the upper end of the flexible blade 40 may be attached to the handle as by the fastening screw 50, a spring washer 51 being preferably located between the head of said screw and the upper portion of the blade while a half-round crown bearing 52 is located between the binding plate 45 and the blade, being received in the rounded socket 53 formed in the back side of the blade. The blade is tapered in thickness toward its lower end as best shown in Fig. 1 so that it will be flexible and produces a whipping action within the liquid to be mixed.

A longitudinal bore 54 may be formed through the handle 47 to accommodate the flexible electric cord 55 which may be connected to a base receptacle or other source of current. The wires

56 from said cord lead through the thumb switch 57 to the magnet so that the operator may manually control the vibration of the blade.

Although only a single blade is shown in the drawing two or more blades may be provided if desired. The change of the thickness, width and length of the blade will change the active motion to different stages of beating or mixing. The blade should be only a few thousandths of an inch thick at its lower end so that it is sufficiently flexible to produce the desired whipping action within the liquid. The arrows in Fig. 1 indicate the general direction of movement of the liquid produced by the vibration of the blade.

In Figs. 4 and 5 is shown an attachment which may be placed upon the blade 40 if desired. This attachment, indicated generally at 58, may be formed of a strip of sheet metal or the like bent upon itself into substantially U-shape, forming the spaced parallel legs 59 preferably perforated at their lower ends as at 60, and terminating at their upper ends in the opposed notched extremities 61 provided with the notches 62 to receive the threaded extension 38 and rounded nut 39 when the attachment is slipped over the tapered portion 63 of the blade 40.

In Fig. 6 is shown a slightly modified form of electromagnet which includes the U-shape pole piece or yoke 25a formed of soft iron or the like. The magnet coil or solenoid 27a is mounted within the pole piece and the cross member 28a is located across the ends of the legs of the U-shape yoke 25a.

The adjusting screw 29a is threaded through the top of the pole piece 25a and a lock nut 30a is provided thereon for holding the screw in adjusted position. The reciprocating armature 32a is mounted for vertical sliding movement within the central longitudinal opening 31a of the magnet coil 27a.

The armature is provided with the reduced extension 33a slidably located through the aperture 34a in the cross member 28a and provided with the threaded portion 33b upon which is mounted the nut 33c for contact with the cross piece 28a, and spaced therefrom the nut 35a having a head 35b between which and the cross member is located a compression spring 37a. A lock nut 36a is located upon the threaded portion 33b of the extension adjacent to the nut 35a.

In Fig. 7 is illustrated a form of the device in which a flexible vibrating disc is provided for mixing the liquid or the like.

In this form of the invention the substantially cylindrical container 15a, for the liquid or the like to be mixed, may be formed of glass, metal or other suitable material and provided with a base 63 of rubber or the like. The cover or lid 16a, formed of sheet metal or the like, may be provided with the annular flange 17a fitting over the rim of the container and detachably connected thereto by the bayonet lock 16b.

The electrical unit for producing the vibratory motion may be the same electromagnet illustrated in Fig. 1 and described above in detail. However, instead of being provided with a handle, as shown in Fig. 1, the shell 20 of the magnet is mounted upon the cover 16a of the container, and the cover 22a of the shell is provided with a grommet 64 through which is located the electric cord 55a leading to the magnet.

The inturned flange 43 at the lower end of the conical portion 21 of the magnet shell is clamped against the top of the container cover 16a by means of the hollow screw stud 44a which is

screwed into the enlarged, internally threaded upper portion 65 of the depending tubular column 66 which extends to a point near the bottom of the container 15a.

With this construction and arrangement of the parts the magnet and vibrating mixing tool are assembled as a unit upon the container cover 16a, so as to be attached to or removed from the container by merely placing the cover thereon or removing it therefrom.

The reduced extension 33a of the armature of the magnet is of considerable length, extending down through the tubular column 66 to a point below the end of the same. The lower end of the extension 33a is bored and tapped as indicated at 67, to receive the screw 68 by means of which the vibratory, mixing disc 69 is attached to the lower end of the extension.

This disc may be formed of sheet metal or the like and is only a few thousandths of an inch thick so that it is quite flexible and may vibrate as indicated in broken lines in Fig. 7 when the magnet is energized. Apertures 70 are preferably provided in the disc 69, and the size and arrangement of apertures may be varied as desired, or the apertures may be eliminated entirely.

A stationary, rigid disc 71 is mounted upon the lower portion of the tubular column 66, by means of the set screw 72 located through the hub 73 of the disc 71. With this construction the disc 71 may be adjusted upon the column 66 relative to the vibratory disc 69. Apertures 74 may, if desired, be formed in the disc 71, and the size and arrangement of these apertures is also optional.

When the device is assembled as shown in Fig. 7 and the magnet energized the flexible disc 69 will be rapidly vibrated, setting up a motion in the liquid as indicated by the arrows in said figure, quickly and uniformly mixing and blending the contents of the container.

A portable adaptation of the mixer shown in Fig. 7, for use with any bowl or container, is illustrated in Fig. 10 in which the magnet shell 20 has a handle 75 connected thereto substantially at a right angle to the axis of the shell and the electric cord 55b is located through said handle and connected to the magnet and to the switch 57b in usual and well known manner.

The tubular column 66 and elongated reduced extension 33a of the armature may be the same as illustrated and described in detail in Fig. 7 and are provided respectively with the stationary disc 71 and the vibrating disc 69 of the same construction as illustrated in Fig. 7. In using this type of mixer the handle 75 is grasped in the hand and the discs are submerged in the liquid to be mixed, which may be placed in any bowl or other suitable container and when the switch 57b is operated to energize the magnet the action of the mixer will be the same as illustrated and described in Fig. 7.

A deluxe form of the invention is illustrated in Fig. 12 in which the liquid container may be in the form of a glass bowl or pitcher 15b provided with a handle 76 by means of which the device may be transported from place to place or tilted to pour the contents from the container.

The glass container 15b is mounted upon a base or shell 77 formed of metal or the like and provides a housing for the electromagnet. This magnet includes the soft iron yoke 25b within which is mounted the magnet coil 27b, the cross piece 28b being connected to the ends of the yoke. The adjusting screw 29b is located through the lower end of the yoke and locked by means of the

lock nut 30b, a screw 24b being located through the bottom plate 78 of the shell or base and threaded into the adjusting screw 29. Any usual type of connector plug may be attached to the plug-in points 79 connected to one side of the shell, the electric wires 80 leading from said plug-in points, through the switch 81 to the magnet. Feet 82, of rubber or the like, may be provided upon the bottom plate 78 so that the device will operate noiselessly.

The glass container 15b is pivotally connected to the base or shell 77 by means of the flange 83 and threaded stud portion 84 of the tubular column 85. A gasket 86 of rubber or the like is located between the flange 83 and the bottom wall of the glass container and the threaded stud portion 84 of the column received in the threaded aperture 87 of the binding plate 88. A pair of spacing standards 89 are connected to the cross member 28b of the magnet and the reduced ends 90 thereof are received in the apertures 91 formed in the binding plate, thus assembling the container shell and magnet together as a unit.

The reduced threaded stud 38b, of the magnet armature, is received in the threaded socket 92 of the vibrating rod 93 which extends upward through the tubular column 85 to a distance spaced above the top thereof.

The sleeve 94 surrounds the tubular column 85 and is connected at its upper end to the upper end of the vibrating rod 93 as by the screw 95.

A thin flexible disc 96 is carried by the lower end of the sleeve 94 and if desired may be provided with apertures 97.

In the operation of the device the liquid to be mixed is placed in the container 15b and the switch 81 is operated to energize the magnet causing the rod 93, and through it the sleeve 94, carrying the disc 96, to be rapidly vibrated vibrating the disc within the liquid and producing a motion of the liquid as indicated by the arrows in Figure 12.

In Fig. 11 is shown another means for producing a rapid reciprocation of the discs. In this device a motor is indicated at 100 and a cam 101 is fixed upon the shaft 102 thereof, a tube 103 with a rod 104 slidable therein are provided for carrying a pair of discs such as shown in the other forms of the invention. A coil spring 105 is located around the rod 104 between the end of the tube and the shoulder 106 on the rod, holding the rod against the cam so that as the cam is rotated it causes a rapid reciprocation of the rod.

A slight modification of the mixer shown in Fig. 7 is indicated in Fig. 14 in which the glass or container 107 is provided with a lid or cover 108 having a tubular extension 109 through which the tube 110 is located. This tube is connected at its upper end to the housing 111 which contains the electro-magnet, and a knob 112 is provided upon the top of the housing for manipulating the same.

The disc 113 is fixed to the lower end of the tube 110 and the rod 114 is slidably located through the tube and connected at its upper end to the armature of the electro-magnet and has the disc 115 connected to its lower end.

In operation, the knob 112 is grasped in the hand and raised and lowered, moving the disc 113—115 between the full line position and broken line position shown in Fig. 14, thus making a thorough mix in a very short time.

The mixers herein illustrated and above described produce a very violent action in mixing

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or beating the liquids and in breaking up or dissolving solids such as malted milk powder and the like and with the use of these mixers it is possible to emulsify oil and water in a few seconds.

Due to the fact that malted milk powder does not readily mix with milk or other liquid it is common practice to mix the powder with a small quantity of milk until it assumes a pasty form after which the full quantity of milk or other liquid is added and mixed.

In using either the disc or blade type of mixers to which the present invention pertains it is only necessary to place the desired quantity of milk or other liquid in the container and put the powdered malt on top of the liquid and after the magnet is energized the powdered malt is whipped through the liquid to a creamy consistency in from five to ten seconds.

I claim:

1. A device for mixing liquids including electrically operated motive means, a rod operatively connected to said motive means so as to be longitudinally reciprocated thereby and a thin, flexible vibrating blade operatively connected to said rod so as to be vibrated thereby and an attachment comprising a strip of metal bent upon itself at its lower end forming spaced parallel legs located over the blade and connected to the upper portion thereof.

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2. A device for mixing liquids including electrically operated motive means, a rod operatively connected to said motive means so as to be longitudinally reciprocated thereby and a thin, flexible vibrating blade operatively connected to said rod so as to be vibrated thereby and an attachment comprising a strip of metal bent upon itself at its lower end forming spaced parallel legs located over the blade and connected to the upper portion thereof, the lower portion of said attachment being perforated.

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