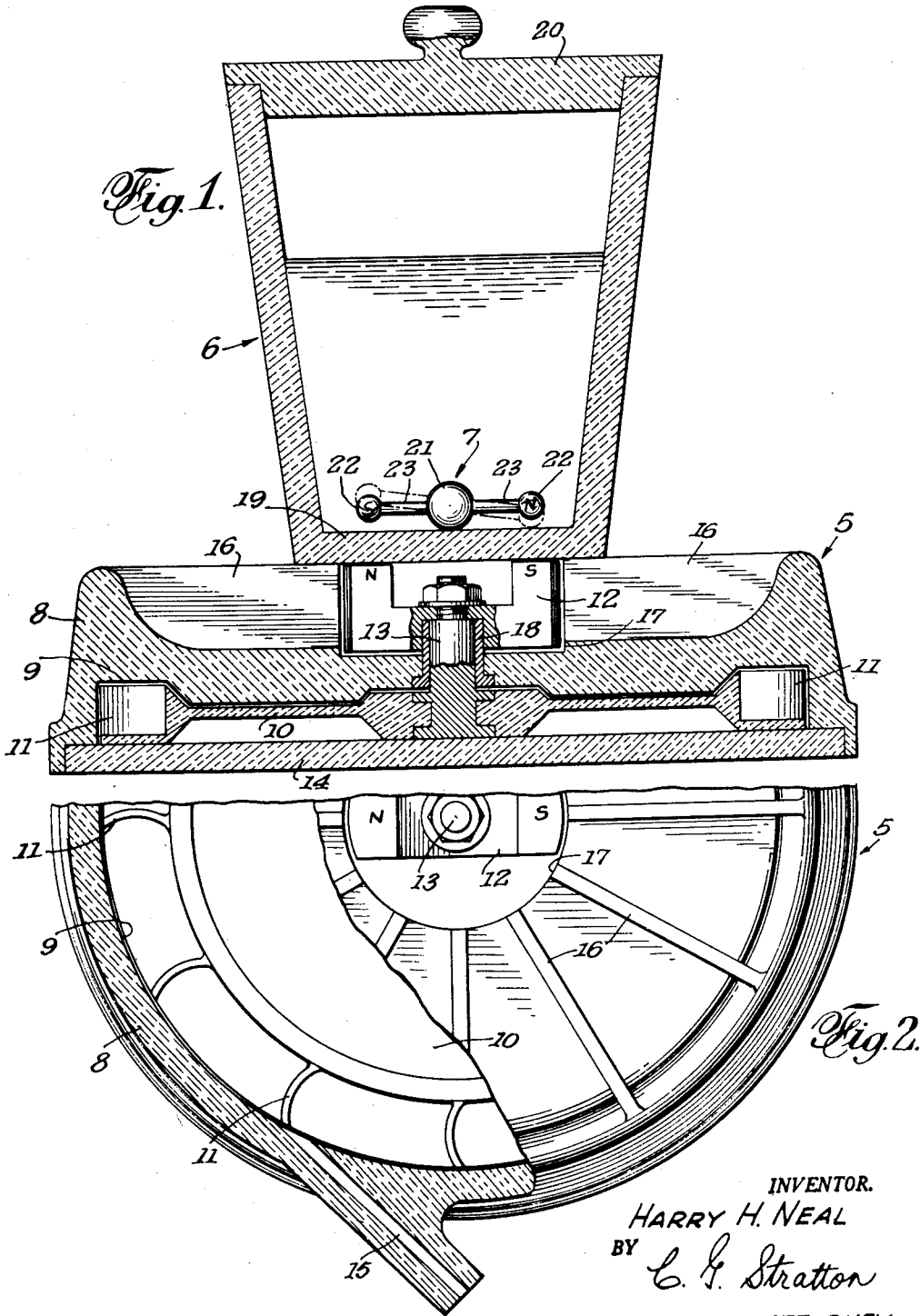


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MAGNETIC MIXER
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MAGNETIC MIXER

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4 Claims. (Cl. 259-108)

1 This invention relates to devices for agitating liquids and more particularly to a magnetic mixer.

Certain mixing or stirring operations must be carried out under conditions wherein the temperature of the mix is maintained at a desired level and wherein there is no additional inclusion of air. An example of the former is in the field of photo developing, especially of color film where even a slight temperature rise deleteriously affects the results. In the latter instance, certain chemical mixing operations would vary the resultant mix should air be drawn into the solution.

Accordingly, the primary object of the present invention is to provide a mixer which will function effectively to stir or mix a solution without materially affecting the temperature thereof and which can be performed without inclusion of air.

Another object of the invention is to provide a mixer, as indicated, which is magnetically operated to provide for complete physical dissociation of the motive means and the vessel which holds the solution being mixed.

Another object of the invention is to provide a magnetic mixer embodying a novel form of stirrer element so formed as to maintain a central position with respect to the magnet which drives it and having minimum frictional engagement with the vessel in which the mixing operation is performed.

My invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes one embodiment of the present invention, which is given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

Fig. 1 is a vertical sectional view of a magnetic mixer embodying the present invention.

Fig. 2 is a broken plan view, partly in section, of the motive means thereof.

The magnetic mixer which is shown in the drawing comprises motive means 5, a vessel 6 containing a liquid solution to be stirred or mixed, and a stirrer element 7 in said vessel and rotated or spun by the means 5.

The motive means 5 is shown as a water motor

2 having a stator 8 formed with an annular chamber 9, an impeller 10 in said chamber and provided with impeller vanes 11, and a magnet 12 driven by the impeller and connected thereto through the medium of a central stud 13. The stator is closed by a bottom plate 14 to thereby enclose the chamber 9. A water inlet 15 is tangentially provided on the stator to direct a stream for impingement against the vanes 11 and thereby drive the impeller 10.

In its present form, the stator 8, in its upper part, is formed with flat-topped fins or the like 16 generally radially arranged to form a support surface for the vessel 6 with a minimum of physical contact therewith. Said fins are terminated short of the center of the stator to provide a cavity or housing 17 in which the rotating magnet 12 is housed. A bushing 18 is fixedly carried in the stator for the stud 13 which is fixed with the impeller. A water outlet for the motor is provided in the usual manner.

Inasmuch as it is desired to transmit little or no heat to the vessel 6, the means 5, or at least the parts 8, 10 and 14, is formed of heat insulating material such as plastics. Further, any slight heat rise in these parts is dissipated by the generous surfaces of the fins 16 and, therefore, there is little or no heat transmission from the means 5 to the vessel 6. The water in the motor rather acts to cool the device and the presence of said water serves as a safety factor in this regard.

The magnet 12 may be of the permanent type, as shown, or may be an electro-magnet. As preferred, the poles thereof are directed to terminate just short of the upper edges of the fins 16 and thereby clear the bottom of the vessel 6.

The vessel 6 may be of any desired form but should have a generally flat bottom 19. An airtight closure 20 for the vessel is provided for the purpose above indicated.

The stirrer element 7 is of novel form to insure its central position in the bottom of the vessel and obviate eccentric disposition thereof during operation. As shown, said element is formed with a spherical central part 21, smaller spherical ends or poles 22, and connecting cylindrical portions 23. The element 7 is formed of magnetic or magnetizable material suitably coated or plated to resist corrosion. In practice, it is dropped to the bottom of the vessel and becomes aligned by magnet force with the poles of the magnet 12, as shown. It will be noted that the stirrer element assumes a tilted position when at rest but levels off under the influence of the magnetic flux lines of the magnet 12 and freely spins there-

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with on a point contact between the vessel bottom 19 and the spherical part 21.

The improved features of the device resides in the provision of motive means which generates little or no heat, in providing said means with non-heat-conducting elements and forming said elements with heat dissipating portions, in providing an improved stirrer element, and providing for the exclusion of air from the solution being mixed.

Other motive means such as electric motors, may be employed, provided the foregoing features are embodied in the structure.

While I have illustrated and described what I now regard as the preferred embodiment of my invention, the construction is, of course, subject to modifications without departing from the spirit and scope of my invention. I, therefore, do not wish to restrict myself to the particular form of construction illustrated and described, but desire to avail myself of all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A magnetic mixer comprising motive means having a casing formed with heat dissipating portions and operated by liquid acting to adsorb heat generated by the motive means, a liquid containing vessel engaged with said heat dissipating portions, a magnet driven by said motive means, and a stirrer element resting on the bottom of said vessel and magnetically associated with the magnet.

2. A magnetic mixer comprising motive means having a casing formed with heat dissipating portions, a liquid containing vessel engaged with said heat dissipating portions, a magnet driven by said motive means, and a stirrer element rest-

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ing on the bottom of said vessel and magnetically associated with the magnet, said stirrer element in operation having only point contact with the vessel.

3. A mixing machine comprising motive means having an upper cavity, a magnet housed in said cavity and having upwardly directed poles and mounted to spin on a vertical axis, heat dissipating fins surrounding said cavity, a vessel removably supported on the fins above the magnet, an air-tight removable closure for the vessel, and a magnetic stirrer element resting on the bottom of said vessel and magnetically rotated by the magnet.

4. A mixing machine comprising motive means having an upper cavity, a magnet housed in said cavity and having upwardly directed poles and mounted to spin on a vertical axis, heat dissipating fins surrounding said cavity, a vessel removably supported on the fins above the magnet, an air-tight removable closure for the vessel, and a magnetic stirrer element resting on the bottom of said vessel and magnetically rotated by the magnet, said stirrer comprising an elongated element having end magnetic poles and a central part larger than said poles and formed to have only point contact with the vessel bottom.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,218,158	Andrews	Mar. 6, 1917
1,758,775	Abbot	May 13, 1930
2,350,534	Rosinger	June 6, 1944