March 12, 1929. L. J. WAHL 1,705,162

AGITATOR

Filed Oct. 16, 1926

Fig. 3

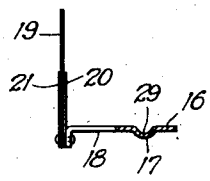
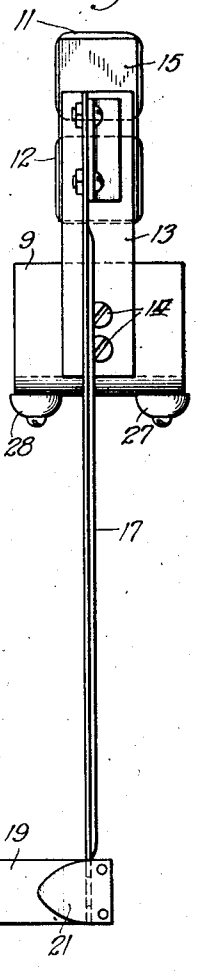



Fig. 1




Fig. 2

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# UNITED STATES PATENT OFFICE.

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## AGITATOR.

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My invention relates to agitators and has for its object the provision of means whereby the contents of a receptacle may be suitably agitated.

More particularly my invention is adapted for use in preparing mixed drinks such as are sold at soda fountains. It is customary in the preparation of such drinks to place the ingredients, some of which are in liquid form, into a receptacle and thereafter to agitate the contents of the receptacle until the ingredients are thoroughly mixed.

It is an object of my invention to provide a simple and efficient means for accomplishing this result. I have found by experiment that a thorough agitation and mixture of such materials may be obtained by the use of a rapidly oscillating element which may be actuated by any suitable means, the preferred form of actuating means being an electro-magnet supplied with alternating current of the customary frequency of about 60 cycles per second.

One difficulty that has been manifest with this type of device is that of getting a sufficient length of agitating arm in order that it may extend to near the bottom of the receptacle without producing an arm the inertia of which is too great for efficient operation. One object of my invention is to overcome this difficulty by placing the support about which the arm oscillates as a fulcrum between the agitating end and the end to which the oscillating force is applied.

Another object of my invention is to provide an oscillating agitator that will cause rapid movement of the contents of the receptacle in a direction transverse to the direction of oscillation of said agitator.

A still further object of my invention is to place the agitator at the most advantageous position in the receptacle for causing rotation of its contents and still retain the oscillating arm near the zone of lowest speed of the contents.

Other objects of my invention as will appear from the description thereof are the improvement of the means for supporting the receptacle the contents of which are to be agitated, the provision of a novel reinforced agitator and the provision of a novel means for permitting air to approach the bottom of the receptacle and aid in the mixing of its contents.

In the drawings—

Fig. 1 is a side view partly in section of the preferred form of my invention;

Fig. 2 is a side view taken at right angles to Fig. 1, certain parts being omitted for the sake of clearness;

Fig. 3 is a section on the line 3—3 of Fig. 1.

Referring now to Fig. 1, the numeral 4 represents an upright standard having secured at the top thereof a frame member 5 by means of the screws 6 or other suitable means, this member 5 which serves as a support for the operating mechanism of the agitator consists of a bar of metal having the upright portion 7, horizontal portion 8 and the upright portion 9 formed by bending the bar of metal. The upright 7 extends to a greater height than the portion 9 and has secured thereto the core 10 of an electromagnet. This core may be made up in the usual manner of a series of laminations and has a pair of leg portions surrounded by the coils 11 and 12. Secured to the upright member 9 by means of screws 14 is a flat vertically extending spring member 13. This spring member has secured at the upper end thereof an armature 15 which co-operates with the end portions of the core of the electro-magnet and forms the moving element of the electro-magnetic vibrator. Secured to the spring 13 on the side of the armature 15 is an arm 16 which extends outwardly and downwardly from the spring 13 so as to be spaced outwardly from the screws 14 to permit of a limited movement toward and away from member 9. This arm 16 is adapted to extend downwardly into a receptacle and is provided with an outstruck rib 17 extending throughout the greater portion of its length. This rib serves to strengthen the arm 16 which is of relatively thin material and serves another purpose which will be referred to later. At the bottom of the arm 16 it is provided with an offset portion 18 having secured at the outer end thereof by rivets or other suitable means agitator blade 19 and the reinforcing plates 20 and 21. As clearly shown by Figs. 2 and 3 this blade 19 extends horizontally in a direction perpendicular to the portion 18 and has the flat sides thereof lying in substantially vertical planes. This blade and the reinforcing plates 20 and 21 are made of resilient material, preferably such material as spring steel, whereby they may give under lateral pressure

and return to a straight position upon release of the pressure. Plates 20 and 21 as shown in Figs. 2 and 3 extend only part way at the opposite sides from the blade 19 and thus serve to stiffen the blade particularly at the point where it is secured to the portion 18. Upon operation of the electro-magnet the arm 16 and spring 13 will be caused to vibrate to and fro about the point where the spring 13 is secured to the member 9, and this vibration will in turn cause a rapid to and fro movement of the blade 19 and when this blade is inserted in the receptacle 22 having the usual mixture of materials to be agitated for forming a drink, such as malted milk, it will set up currents in the contents of the receptacle in a manner to be hereinafter described. The blade made flexible to a certain degree, will have an action similar to that of a fish's tail when propelling the fish through the water; that is the outer or free end of the blade 19 will, due to the pressure of the liquid thereagainst, lie somewhat behind the secured end thereof and have a tendency to slap or drive the liquid outwardly and rearwardly away from the blade. The current set up by this action will be directed by the curved surface of the receptacle into a circular path, thus setting up a rotation of the liquid in the receptacle.

Since the speed of vibration of the arm 16 is very high when the electro-magnet is operated from the usual 60 cycle alternating current supply, it is obvious that a rapid rotation of the liquid in the receptacle will result. The purpose for making the arm 16 of a thin blade-like form is to cause it to have the least amount of resistance to the liquid when it is vibrated since, as shown, it is vibrated in an edgewise direction. Furthermore the construction is such that the arm 16 extends almost centrally of the receptacle 22 lying preferably just sufficiently far enough to the outer side of the center of the receptacle that it will, upon vibration, not pass inwardly of the center line of the receptacle.

The rib 17 as shown, extends outwardly in a direction opposite of the blade 19, thus forming a recess 29 in the side of the arm. This recess serves a very useful function in providing a path whereby air from above the receptacle may creep down to the bottom of the arm and become mixed with the liquid content of the receptacle. It has been found by experiment that due to the fact that the liquid is rotating away from the recess and furthermore that the lower end or the arm is swinging through a greater distance than the upper portion thereof, a suction will be created downwardly along the recess which will draw the air to the bottom of the receptacle in sufficient quantities to aerate the liquid to the desired degree.

The receptacle 22 is supported upon the standard 4 and the frame 5 in a novel manner by means of rubber knobs or pins. The type of receptacles most widely used in the drink mixing business have an upwardly extended bottom portion such as shown at 23, which leaves a rim around the lower outer edge of the receptacle. This rim is hooked over the rubber pin 24 having the enlarged head 25 thereon and secured to the lower portion of the standard by means of the screw 26. Depending from the overhanging portion of the frame 5 are the rubber knobs 27 and 28 spaced on opposite sides of the arm 16 and secured to the portion 8 by screws or other suitable means. Thus a receptacle may be hooked over the arm 16 and pressed upwardly until the rim on the bottom thereof can be hooked over the knob 25 and then the receptacle may be allowed to tip outwardly against the knobs 27 and 28 where it will rest securely.

I have also provided a novel means for throwing the vibrating mechanism into operation, which consists of a pin 30 extending through an opening 31 to the hollow interior of the standard 4. This pin is mounted upon the spring 32 which is secured to and insulated from the standard 4 in any suitable way, the pin 30 being also insulated from the spring 32. Secured to the upper end of the spring 32 is a contact 33 which is connected by means of the conductor 36 to the coil 12, This contact 33 is pressed inwardly by the receptacle engaging the pin 30 into engagement with the second contact 34 which is secured on the spring 35, also insulatingly mounted on the standard 4. Contact 34 is secured to the lead 37 extending to a source of current, the other side of this source being connected by the lead 38 to the coil 11 which is electrically connected to the coil 12. Thus it will be seen that when the receptacle 22 is removed pin 30 will be allowed to move outward and break the contact between members 33 and 34 and stop the vibratory mechanism.

Means for adjusting the spacing between the electro-magnet and the armature has been provided and this consists of the pin 39 pressing against the free end of the member 9 and having at its other end the screw 40 which is screw-threaded in the member 7 and has milled head 41 at the outer end thereof for adjusting the same to increase or reduce the distance between the electro-magnet and the armature. A lock nut 42 is also provided for locking the screw in the desired position.

While I have described one form which my invention may take, I wish it to be clearly understood that I do not intend to limit myself to the exact details shown and described, but that I intend to avail myself of all such modifications as would occur to one skilled in this art and as comes within the scope of the claims.

Having thus described my invention what

I claim and desire to secure by Letters Patent is:—

1. A device of the character described comprising an arm having agitating means at one end adapted to be inserted in a receptacle for agitating the contents thereof, vibrating mechanism including an electro-magnet at the other end of said arm for causing it to vibrate and means intermediate said agitating means and said mechanism for supporting said arm.

2. A device of the character described comprising an arm having an agitating means at one end thereof, vibrating mechanism at the other end thereof for vibrating said arm and a support for said arm intermediate said vibrating mechanism and said means.

3. A device of the character described having a downwardly extending arm, vibrating mechanism at the upper end of said arm for causing said arm to vibrate, means spaced below said mechanism for supporting said arm, the lower end of said arm being laterally offset and an agitator secured to said offset end.

4. A device of the character described having a downwardly extending arm, vibrating mechanism at the upper end of said arm for causing said arm to vibrate, means spaced below said mechanism for suporting said arm, the lower end of said arm being laterally offset and a resilient agitator blade secured to said offset end.

5. In a device of the character described having a downwardly extending arm adapted to be inserted in a receptacle and mechanism for causing said arm to vibrate in a direction transversely of its axis, an agitating blade extending transversely of the direction of vibration, said arm having a portion extending laterally in the direction of vibration upon which said blade is mounted.

6. In a device of the character described having a downwardly extending arm adapted to be inserted in a receptacle for agitating the contents thereof, and means for vibrating said arm, said arm being made of relatively thin material and offset in its own plane.

7. In a device of the character described having a downwardly extending arm adapted to be inserted in a receptacle for agitating the contents thereof, and means for vibrating said arm, a flexible agitator blade secured to said arm, said flexible agitator being stiffer near the end which connects to the vibrating arm.

8. In a device of the character described having a downwardly extending arm adapted to be inserted in a receptacle for agitating the contents thereof, and means for actuating said arm, said arm being laterally offset adjacent its lower end and moving to and fro in the direction in which it is offset, the offset portion of said arm having a flexible agitating blade at the free end thereof.

9. In a device of the character described having a downwardly extending arm adapted to be inserted in a receptacle for agitating the contents thereof, and means for actuating said arm, a thin resilient agitator blade secured to said arm and a resilient reinforcing plate secured to said blade and arm and extending outwardly from said arm along said blade.

10. A device of the character described comprising a support, an arm depending from said support adapted to have a portion thereof inserted in a receptacle for agitating the contents of said receptacle and means for vibrating said arm in a direction transversely of its length, said arm having an elongated recess in one side thereof extending substantially throughout the length of the portion to be inserted in the receptacle.

11. In a device of the character described comprising a support, a thin substantially flat arm carried by said support adapted to extend into a receptacle and having means at the lower end thereof to agitate the contents of said receptacle and means for rapidly swinging said arm edgewise to and fro about said support, said arm having an elongated recess extending along one flat side thereof.

12. A device of the character described having in combination a support, a spring having its lower end secured to said support, electro-magnetic means for vibrating said spring comprising an armature secured to said spring and an electro-magnet cooperating therewith, an arm depending from said spring and armature adapted to have the lower portion thereof inserted in a receptacle and agitating means carried by said arm for agitating the contents of said receptacle, said arm and armature being adapted to rotate back and forth around the secured end of said spring as a center.

13. A device of the character described having in combination a support, a spring having one end secured to said support, electro-magnetic means for vibrating said spring comprising an armature secured to said spring and projecting above its point of support and an electromagnet cooperating therewith, an arm depending from the armature, said arm adapted to have the lower portion thereof inserted in a receptacle and a resilient agitator blade secured to the lower end of said arm for agitating the contents of said receptacle.

14. A device of the character described having in combination a support, a spring having one end secured to said support, electro-magnetic means for vibrating said spring comprising an armature secured to said spring and an electromagnet cooperating therewith, an arm depending from said spring adapted to have the lower portion thereof inserted in a receptacle and an agitator blade extending at right angles to said arm for agitating the contents of said re-

ceptacle, said arm moving in one direction when the armature moves in the other about the secured end of the spring as a center.

15. In a device of the character described having a downwardly extending arm adapted to be inserted in a receptacle for agitating the contents thereof, and means for vibrating said arm, a flexible agitator blade secured to said arm and a reinforcing member secured to said arm and supporting said blade.

16. In a device of the character described having a downwardly extending arm adapted to be inserted in a receptacle for agitating the contents thereof, and means for vibrating said arm, a flexible agitator blade secured to said arm and reinforcing members secured to the opposite sides of said blade.

In witness whereof, I hereunto subscribe my name this 5th day of October A. D., 1926.

LEO J. WAHL.