Nov. 22, 1960 M. C. SANZ 2,961,302

LABORATORY APPARATUS

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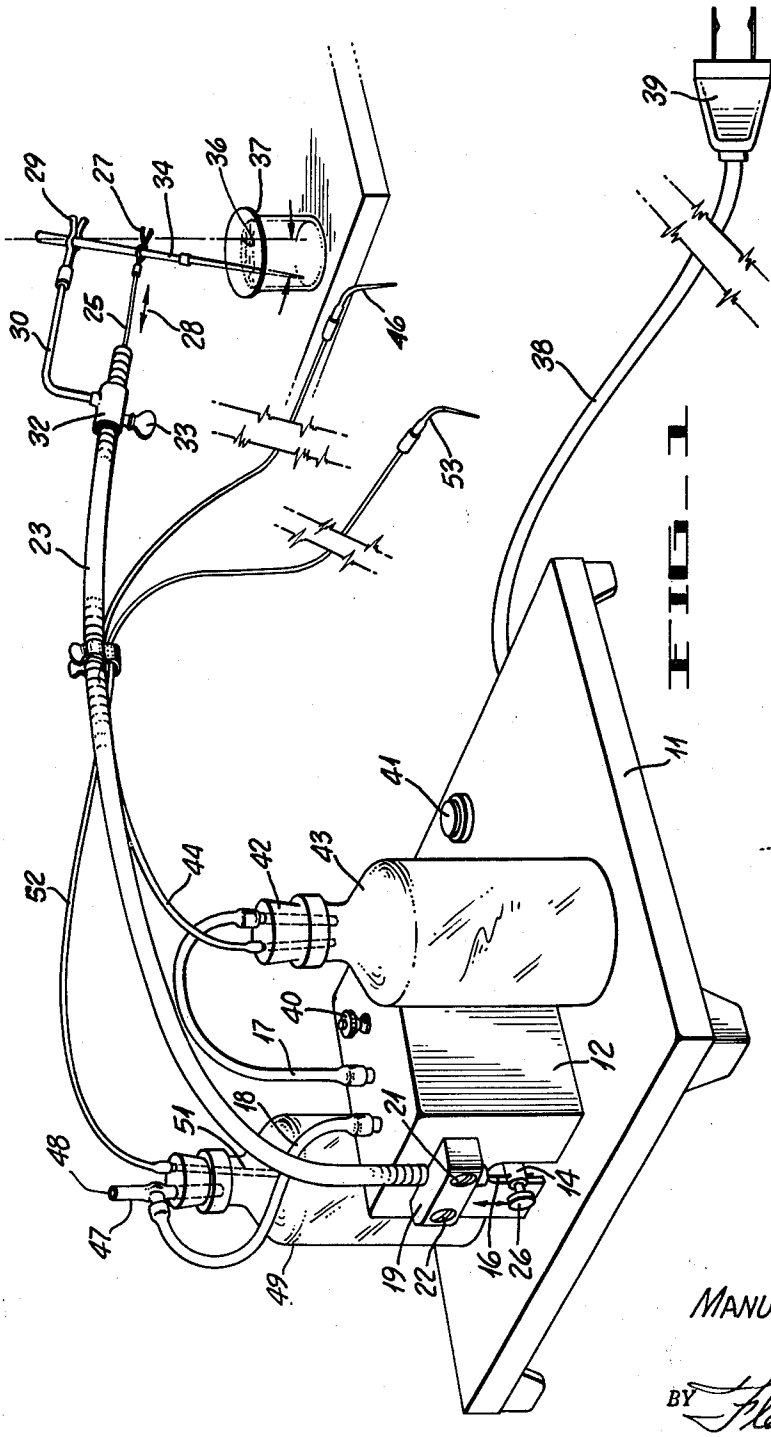


FIG. 1

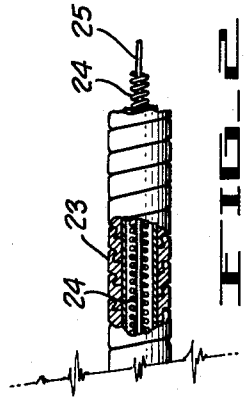


FIG. 2

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This invention relates generally to laboratory apparatus and more particularly to a laboratory stirring apparatus.

It is an object of the present invention to provide a laboratory apparatus which is suitable for stirring liquid solutions.

It is another object of the present invention to provide a stirring apparatus in which the stirrer may be easily disposed as desired.

It is another object of the present invention to provide a laboratory stirring apparatus in which a flexible sheath encloses a spring wire which is vibrated axially. The wire engages a stirrer and serves to pivot the same about a pivot whereby the stirrer agitates or stirs the liquid in which it is disposed.

It is another object of the present invention to provide an improved laboratory apparatus which includes stirring means, and means for supplying and removing liquid.

These and other objects of the present invention will become more clearly apparent from the following description when read in conjunction with the accompanying drawing.

Referring to the drawing:

Figure 1 is a perspective view showing the apparatus; and

Figure 2 shows the special cable employed in the apparatus.

A platform **11** serves to support the various components. A motive device **12** is carried on the platform. The device **12** may be, for example, an electromechanical device which has a vibrating member **14**. The member moves up and down as indicated by the arrows **16**. The device may include pump means which serves to provide a vacuum to the tube **17** and pressure to the tube **18**. One such device **12** is an aquarium pump.

A cable is suitably attached to the apparatus **12**, for example, by means of the clamp **19** which is secured thereto by the screws **21** and **22**. The cable includes an outer flexible sheath **23** which may be woven or wound to give the desired flexibility and stiffness, an inner coaxial flexible sheath **24** which may be prepared as noted, and a flexible wire **25** which is adapted to slide axially within the sheath **24**. The sheath **24** preferably fits loosely within the outer sheath. As a result, there is play between the two. The sheath **24** is secured to the sheath **23** at the stirrer end.

One end of the wire is suitably attached to the vibrating member **14**, as for example, by the set screw **26**. The other end of the cable is provided with a clamping means **27**, for example, the hairpin-like clamp illustrated. Thus, vertical movement of the member **14** causes to and fro movement of the clamp **27** as indicated by the arrow **28**. A fixed clamp **29** is carried by the arm **30** which is suitably secured to the outer sheath **23**. For example, the member **30** may be held in the collar **32** which is secured to the sheath by means of the thumb screw **33**. The collar may be rotated and moved along the sheath **23** to position the stirrer at any angle with

respect to the vertical. The stirrer **34** is clamped in the movable clamp **27** and fixed clamp **29** as indicated. The to and fro movement of the flexible wire **25** causes the clamp **27** to move back and forth thereby pivoting the stirrer **34** at the fixed clamp **29**. The stirrer is then disposed in the liquid **36** which is held in a suitable container **37** and serves to stir or mix the same. The stirrer is moved to and fro in a sinusoidal fashion. That is, it moves slowly at the start of a stroke and accelerates until the middle of the strike at which time it decelerates and slowly stops at the other end of the stroke. This motion is a result in part of the play between the various parts making up the cable.

It is apparent that the apparatus illustrated and described is readily adaptable to be moved to adjacent liquid reservoirs. It need not be secured to a ringstand or to the container containing the liquid. The length of the stroke is controlled by the adjustment **40** and/or by controlling the tension of the wire **25**.

Power to the electrical apparatus may be applied through a cord **38** which includes a suitable plug **39**. A switch **41** may be carried by the platform **11** and serves to provide means for energizing and de-energizing the electromagnetic means.

In many applications it is desirable to have means for sucking up or removing any spilled liquid. Thus, the vacuum hose **17** is connected through the stopper **42** with the interior of the vessel **43**. A flexible tube **44** communicates with the inside of the vessel and has a relatively rigid member **46** affixed to the other end thereof. The member **46** may then be placed in a fluid and the suction in the vessel **43** serves to draw the liquid through the tube **44** into the vessel which acts as a receptacle.

In certain applications it is also desirable to be able to supply fluid to various vessels or to use fluid for washing off various apparatus. The pressure tube **18** is suitably attached to the pipe **47** which has the end **48** open to the atmosphere and its other end communicating with the inside of the vessel **49**. A second pipe **51** extends downwardly into the vessel and is submersed in the fluid carried thereby. A flexible tubing **52** is connected to the upper end of the piping and is provided with a member **53**. Thus, if it is desired to supply fluid to vessels or to wash off apparatus, etc., the opening **48** is closed with one finger and the pressure within the vessel forces the liquid outward along the tube through the member **53**.

Thus, it is seen that an improved stirring apparatus is provided. It is adaptable to be disposed at any convenient location and need not have special apparatus to hold the same in a position over the liquid to be stirred. The position of the stirrer with respect to vertical may be easily adjusted and the length of the stroke may be controlled. Furthermore, the apparatus includes means for removing or supplying liquid as desired.

I claim:

1. A laboratory stirring apparatus comprising a flexible member, said member including at least one sheath and a wire loosely disposed within the sheath, means for moving one end of the wire to and fro in the direction of its length, a stirrer, means disposed at the other end of said wire for engaging said stirrer, and means attached to said sheath for engaging another portion of said stirrer whereby the stirrer is pivoted on said last named engaging means by the to and fro movement of said wire.

2. A stirring apparatus comprising electromagnetic means including an oscillating member, a flexible cable attached to said means, said flexible cable including at least an outer flexible sheath and an inner flexible wire loosely carried within said outer sheath, the adjacent

end of said wire being connected to said oscillating member whereby it is moved to and fro in the direction of its length, the sheath being secured to said electromagnetic means so that it remains stationary, the other end of said wire being provided with clamping means, a clamp secured to said sheath, a stirring rod adapted to be clamped between said first and second clamps and adapted to be pivoted on said first clamp by the to and fro movement of the flexible wire.

3. A laboratory apparatus comprising a flexible member including first and second sheaths, said second sheath loosely disposed within the first and a wire carried within the second sheath for lengthwise movement, means for moving one end of the wire in the direction of its length, a stirrer, means disposed at the other end of the wire for engaging the stirrer and means attached to the first sheath for engaging another portion of said stirrer whereby the stirrer is pivoted on said last named engaging means by movement of said first named engaging means.

4. A laboratory apparatus comprising a flexible elongated member including an outer sheath and a member

loosely disposed within said sheath, means attached to one end of said member to impart sinusoidal oscillatory motion to the same in the direction of its length, a stirrer adapted to be immersed in a solution to be stirred, means carried by the other end of said member for engaging said stirrer, clamping means releasably secured to the adjacent end of the outer sheath and adapted to clamp said stirrer whereby the stirrer is pivoted on said clamping means and moves with a to and fro motion in said solution, said flexible member having lost motion due to the loose fit within the sheath whereby the stirrer accelerates at the start of its motion and decelerates at the end of its motion to undergo a sinusoidal oscillatory motion.

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