Dec. 5, 1967 K. LANDSBERGER 3,356,346

TEST TUBE STIRRING SUPPORT

Filed Jan. 3, 1966

FIG. 1

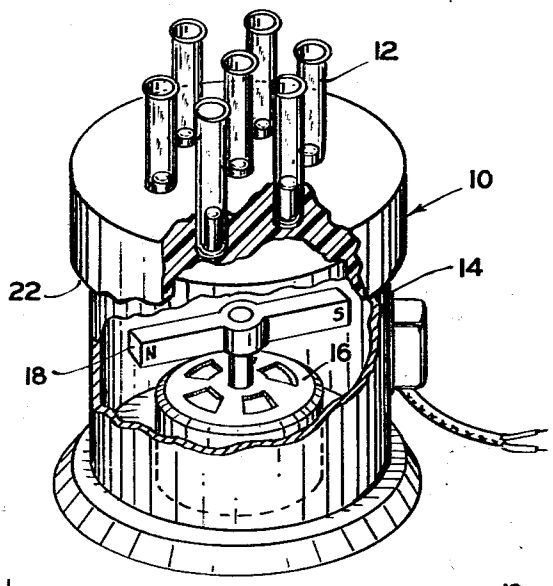
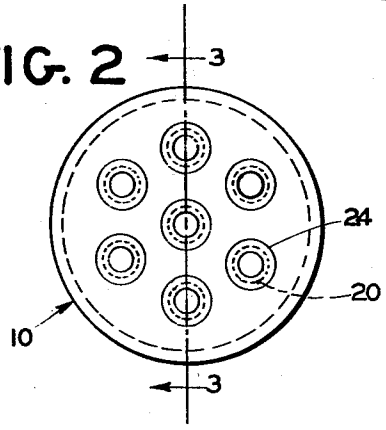


FIG. 2



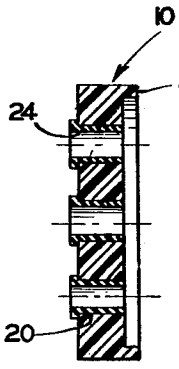


FIG. 3

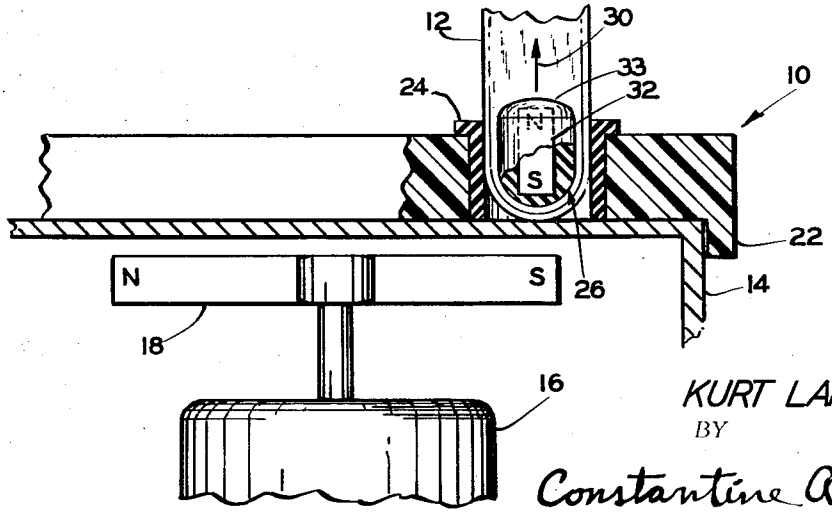


FIG. 4

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TEST TUBE STIRRING SUPPORT

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ABSTRACT OF THE DISCLOSURE

A test tube stirring support block, for use in combination with a stirring machine, having a stirring bar slightly smaller than the vertical cross-section of a vessel in which there is material to be stirred. The stirring bar having south and north pole ends extending vertically within said vessel and wherein the machine comprises a magnetic bar rotated under the stirring bar for attracting and repelling the stirring bar upon applying the north field and then the south field beneath said stirring bar and thereby vertically agitating the stirring bar to stir the material within the vessel.

This invention relates to stirring devices and more particularly to a test tube stirring support block for use in combination with a stirring machine.

Heretofore, stirring machines were used in magnetic stirring of single vessels. The positioning of these vessels on the stirring machine presented no support problem since they were large and had substantially large bases and thereby were not likely to fall off the stirring machine.

Heretofore, the magnetic stirring of test tubes presented two problems. First, in that they were too small to stay on the stirring machine without any external means of support and second, the test tubes were so narrow that they could only be stirred by some means that can produce vertical oscillation.

This invention solves both problems by providing a test tube stirring support block for supporting small-sized vessels, such as the test tubes, and by also using the characteristic narrow section of the test tube for guiding therein a unique stirring magnet for vertical movement. Therefore, the support block described herein is so designed to firmly but gently hold a plurality of test tubes while the fluid therein is vertically stirred by the unique stirring magnet attracted and repelled by conventional means such as the magnetic stirring machine. Equally attractive is the fact that this invention provides for a plastic stirring support block of soft, dense vinyl material which permits full visibility of the contents of the test tubes and is so designed to support the test tubes in a vertical position on top of the stirring machine with the added advantage of simultaneously permitting agitation of the contents of the test tubes.

Therefore an object of this invention is to provide a small glass vessel support block while permitting efficient vertical agitation of the fluid within the vessel by a unique stirring magnet.

Another object of this invention is to provide a means for converting any stirring machine from a single vessel stirrer to a plurality vessel stirrer.

A further object of this invention is to provide a test tube stirring support block which can safely hold any size glass test tube.

An additional object of this invention is to provide a stirring support which can hold for stirring extremely small tubes, permitting visibility of the contents of said tubes, and which can be made to hold a variety of different sized small tubes.

These and other objects and features of the invention are pointed out in the following description in terms of the embodiment thereof which is shown in the accompanying drawing. It is to be understood, however, that

the drawing is for the purpose of illustration only and is not a definition of the limits of the invention, reference being had to the appended claims for this purpose.

In the drawing:

FIGURE 1 shows a side elevational view, partly in section, of a test tube stirring support block assembled in combination with a stirring machine in accordance with a prepared embodiment of this invention;

FIGURE 2 shows a plan view of the test tube stirring support block shown in FIGURE 1;

FIGURE 3 shows the support block, in section, taken substantially along line 3—3 of FIGURE 2; and

FIGURE 4 shows a fragmentary detailed view of the support block with a test tube therein.

Referring to FIGURE 1 of the drawing, there is shown a test tube stirring support block **10** having a plurality of apertures in which there is inserted a plurality of test tubes **12**. The stirring support block **10** fits on the top of a stirring machine **14**. The stirring machine is comprised of a motor **16** supporting for horizontal rotation a magnetic bar **18**. The magnetic bar **18** revolves to produce a magnetic field to magnetically attract and repel or vertically actuate another magnetic element contained within the test tube as hereinafter more fully described.

The stirring support block **10** which is shown in detail in FIGURES 2 and 3 is comprised of a circular plastic material such as vinyl through which is formed seven apertures **20** to hold seven test tubes **12**. The periphery of the circular plastic block is provided with a skirt **22** which is used to hold the block **10** onto the stirring machine **14** when in operation, without slippage, as best shown in FIGURE 4. The seven apertures **20** are provided with bushings **24** that can be inserted within the apertures **20** to change the inside diameter of the apertures **20** and thereby permit different sized test tubes to be supported therein.

FIGURE 4 shows a detailed fragmentary portion of the support block in which there is inserted the test tube **12**. A stirring magnet **26** is shown having a south pole S extending downwardly and a north pole N extending upwardly. The stirring magnet is comprised of a bar magnet **32** encapsulated in a plastic material **33** that does not react with the fluid contained within the test tube nor does it contaminate said fluid. In addition the stirring magnet has the configuration of the bottom portion of the test tube so as to be guided to move only in a vertical direction within the test tube. The test tube **12** is placed as close as possible to the stirring machine **14** so that the magnetic bar **18** of the stirring machine **14** can more efficiently affect the bar **32** of the stirring magnet **26**. That is, the stirring bar **26** in the tube **12** can be agitated by the magnetic bar **18** of the magnetic stirring machine **14** for providing the vertical mixing action.

The block **10** may be made of soft, dense vinyl material which can hold the glass tubes firmly but gently in the snug fitting apertures **20** or can be provided with removable vinyl bushings **24** for use with different sized test tubes. The heavy weight of the vinyl material gives stability while its non-skid surface in combination with its skirt **22** keeps the block **10** in place on the stirring machine **14**.

As brought out before, the support block **10** can be made in such a fashion, that by using bushings or inserts **24** around various shaped vessels or within the apertures **20** such as the bushings **24** may be versatile in supporting various sizes and shapes of containers at one time. For safety, a clear cover can fit around and over the support block **10** (not shown) protecting the test tubes when in operation.

It should also be understood that the support block **10** can be manufactured with legs (not shown) to allow a

portion of the vessel to extend below the block for visual check when very small samples are used for stirring.

In the operation of the system the magnetic bar **18** is rotated by a motor **16**. When the south pole S of the bar magnet **18** is below the test tube **12** as shown in FIGURE 4 it will repel the south pole S of the stirring bar **32**, thereby causing the stirring magnet **26** to rise, as shown by arrow **30**. When the north pole N of the magnetic bar **18** is rotated in position under the stirring magnet **26** it will attract the south pole S of the stirring magnet **26** to bring it down. In this manner, the stirring magnet **26** will be agitated as the bar **18** is rotated by the stirring machine **14** to produce the mixing action within the test tube **12**.

As brought out before, it should be understood that the stirring magnet **26** is made of a metallic bar **32** encapsuled in the plastic material **33** which is impervious to material normally encountered in mixing vessels.

In summary, therefore, this invention provides for a stirring support block which can convert any stirring apparatus from a single vessel stirrer to a multiple vessel stirrer. In addition, this stirring support block provides for stirring of extremely small tubes while at the same time can be made to hold a different sized vessel. Furthermore, this stirring support permits full visibility of the contents having minimum obstruction and with a maximum safety in supporting test tubes on stirring machines. In addition, this invention is provided with a stirring magnet of a unique configuration so as to be guided for more efficient vertical agitation of any fluid contained within the test tubes.

Although only one embodiment of the invention has been illustrated and described, various changes in the form and relative arrangements of the parts, which will now appear to those skilled in the art may be made without departing from the scope of the invention. Reference is, therefore, to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A stirring support in combination with a magnetic stirring machine comprising, means for removably connecting said stirring support onto said machine without slippage and wherein said stirring support defines means for supporting a plurality of vessels adapted to contain material therein for stirring, each of said vessels including means agitated by the magnetic force produced by said magnetic stirring machine for stirring the material within said vessels, each of said vessels extending vertically and wherein said last-mentioned means further comprise a stirring bar slightly smaller than the vertical cross-section of said vessel, said stirring bar having south and north pole ends extending vertically within said vessel and said machine comprising magnetic means for attracting and repelling said stirring bar upon applying a north field and a south field beneath said stirring bar and thereby vertically agitating the stirring bar to stir the material within said vessel.

2. The structure of claim **1** wherein said vessels extend vertically and a stirring bar having south and north pole ends extending vertically within said vessel and said tic material encasing said bar for protecting said bar from being disintegrated by the material being stirred and being

of a configuration substantially of the size and shape of the lower portion of said vessel for easy movement therein by said magnetic means.

3. The structure of claim **1** characterized in that said means for supporting a plurality of vessels are vinyl bushings having apertures of a size depending on the size of the plurality of vessels to be supported by said stirring support.

4. The structure of claim **1** wherein said magnetic stirring machine comprises a motor, a magnetic bar connected to said motor and rotatable about a horizontal plane beneath said stirring support wherein said stirring support having means for supporting a plurality of test tubes and stirring magnets within said test tubes having a configuration so as to be operably movable vertically within said test tubes and thereby being actuated by the magnetic flux of said magnetic bar as it rotates to move said stirring magnet up and down for stirring the material contained within said test tube.

5. The structure of claim **1** wherein said stirring support is made of soft plastic material defining a plurality of vertically extending apertures for supporting therein a plurality of test tubes, including the combination of stirring magnets supported within each test tube, a magnetic stirring machine adjacently supporting said stirring support having a motor and a magnetic bar revolving to produce a magnetic field beneath said stirring magnet to alternately attract and repel said magnet for movement of said magnets in a vertical direction so as to agitate said material in said test tubes and reducing means interposed between said stirring support and said test tubes for snugly supporting said test tubes.

6. The structure of claim **5** wherein the reducing means is a bushing of different size and insertable within the apertures of said stirring support.

7. The structure of claim **5** characterized in that said stirring support comprises a downwardly extending skirt having an inside diameter slightly larger than the outside diameter of the stirring machine to thereby pevent slippage of the support from said machine and wherein said support is of substantially smaller size than the vertically extending test tubes to permit visibility of the material within the test tube while it is being stirred.

8. The structure of claim **1** wherein said stirring magnet comprises a bar magnet having a south pole and a north pole extending in a substantially vertical line and plastic material encapsulating said bar magnet so as not to contaminate said material within said test tubes.

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