

March 28, 1944.

J. R. LATHAM

2,345,130

LIQUID AGITATOR

Filed Sept. 26, 1942

2 Sheets-Sheet 1

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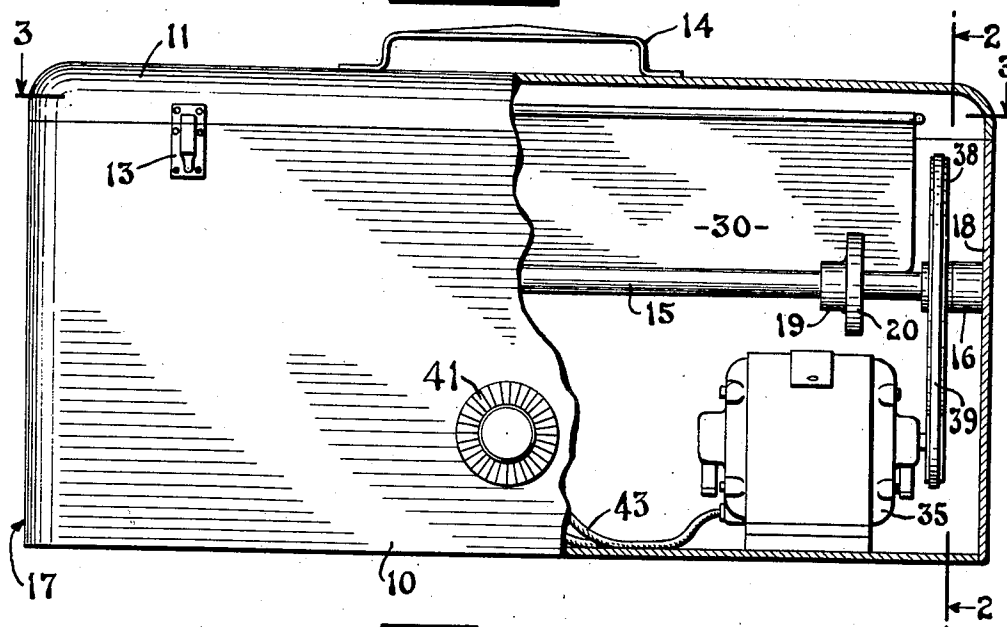
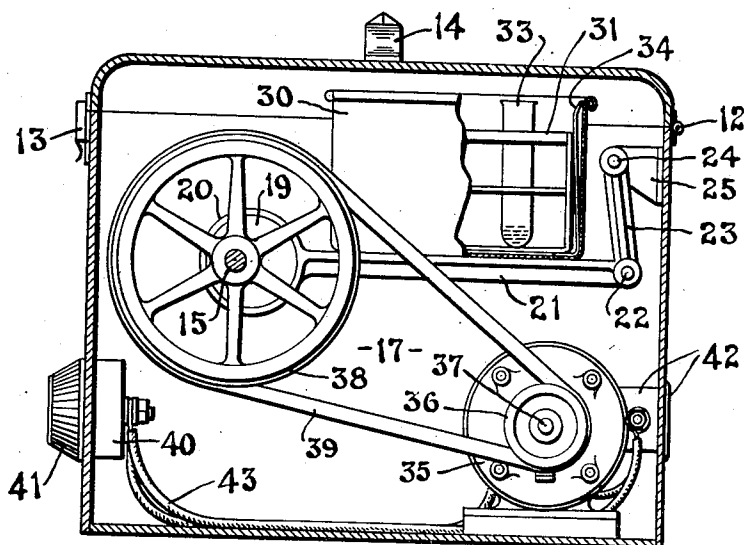


FIG. 2



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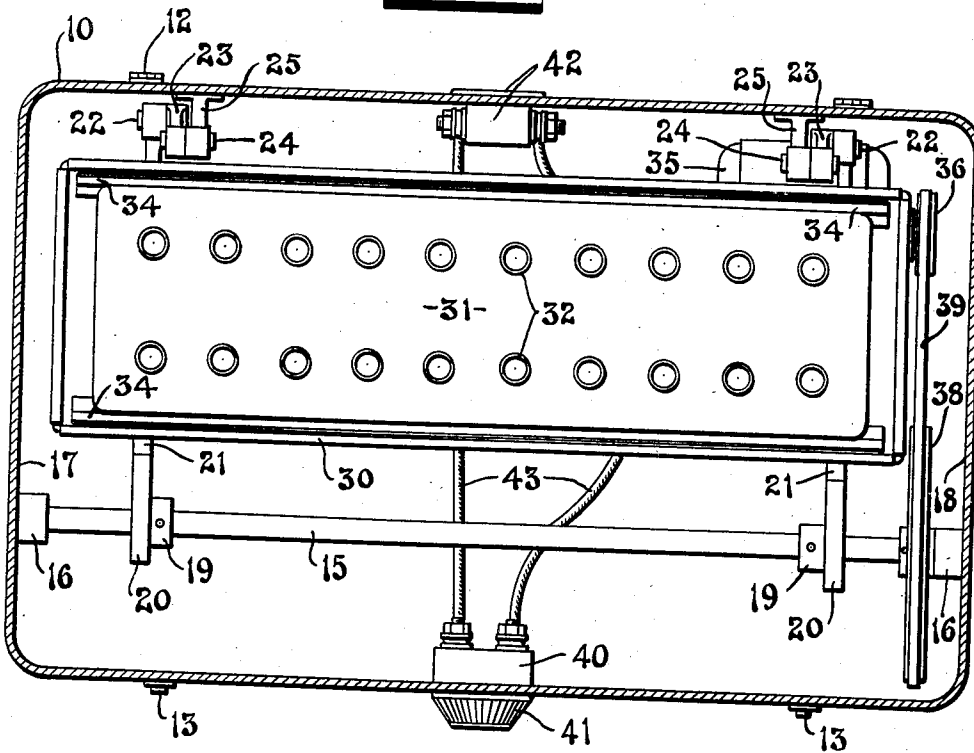
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Fig. 3



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LIQUID AGITATOR

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Application September 26, 1942, Serial No. 459,769

1. Claim. (Cl. 259—54)

This invention relates to improvements in liquid agitators.

An important object of my invention is to provide a device which will meet the present need for a controlled shaking apparatus capable of effectively and efficiently mixing any liquid or combination of liquids by a thorough agitation thereof, such as is necessary at times to give optimum results.

Another object thereof is to provide a device of the class described in which liquids may be agitated at a predetermined speed and within a predetermined time.

Another object of my invention is to produce an agitator particularly suitable for use in clinical laboratories in the more efficient shaking and mixing of the reagents used in making what is known as a Kahn test; now in use for the purpose of determining the presence or absence of syphilitic infection in human beings.

Other objects and advantages of my invention will either become apparent or be specifically referred to in connection with the following description thereof written in connection with the appended drawings, which illustrate a preferred embodiment thereof, and in which

Figure 1 is an elevational view of my agitator with a portion broken away in order to show certain of its structural features.

Figure 2 is a sectional end view of the device taken on line 2—2 of Figure 1 and looking in the direction of the arrows, and

Figure 3 is a plan view of the device taken on line 3—3 of Figure 1 and looking in the direction of the arrows.

Referring particularly to the drawings, it will be seen that my device is preferably constructed in the form of a box 10 having a cover 11 hinged thereto as at 12 and provided with any suitable lock or fastening means 13 such that by means of the handle 14, secured to the cover, the same is rendered portable, compact and sanitary. It will be understood however that other forms of a suitable frame or mounting therefor may be used.

Mounted within the box 10 is a rotatable horizontal shaft 15 having the ends thereof journaled in bearings 16 secured in any suitable way to the inside surfaces of the ends 17—18 of said box 10. On the shaft 15, and preferably at points spaced equidistant from the journals 16, are provided any suitable form of crank means, which are here shown as a pair of eccentrics 19 on each of which is rotatably mounted an eccentric strap or eye 20 integrally formed, respectively, on the ends of a pair of pitmans 21. The ends of the

pitmans 21, remote from the eyes 20, are pivoted respectively, as at 22, to the lower ends of a pair of depending links 23. The upper ends of the links 23 are pivoted, respectively, as at 24, to brackets 25, secured in any suitable way to the inside surface of the back of the box 10.

Referring now to Figure 2 it will be understood that when the eccentrics 19 are positioned as shown with their maximum throw extending rearwardly of the structure, the pitmans 21, supported both by said eccentrics and links 23, will preferably be disposed in the same horizontal plane and employed as supports for a tank, tray or rack holder 30 to which the same is secured by any suitable means, not shown. A suitable test tube holder of a sort commonly sold and used for the purpose, or rack 31, provided with a plurality of holes 32, see Figure 3, and adapted to confine and support test tubes 33 in an upright position, is disposed within the tray 30. A retaining means, here shown in the form of spring means 34, is mounted in the tray 30 to grip releasably and retain the rack 31 in place in said tray.

While any suitable variable speed motive means may be used for driving the shaft 15 and thereby impart to the tray 30 a compound motion of translation, tilting and rotation, as will be understood from the foregoing description of the structure of my agitator, I prefer to use, and have therefore illustrated here, an electric motor 35 mounted in the box 10 having a suitable pulley 36 keyed to the armature shaft 37 thereof and adapted to drive the shaft 15 by means of a pulley 38, keyed thereto, and a belt 39 adapted to be driven by the pulley 36, as shown. To regulate the speed of the motor 35, a suitable rheostat 40 is mounted on the inside front wall of the box 10 and connected in series with the motor, as shown. The rheostat is provided with a controller knob 41 disposed on the outside thereof and by means of which the speed of the motor may be varied.

A plug socket 42 is connected in the motor circuit 43, as shown, and mounted on the back of the box 10 so that electric service connections may be made readily by means of an ordinary lamp cord assembly such as used extensively in connection with any well known household electric appliance.

At a certain stage in the performance of a Kahn test for the detection of syphilis referred to above, it is necessary to shake samples of blood with certain reagents in small test tubes for a certain number of minutes at a certain definite

designated speed and in a certain manner. This was originally, and even today, largely done by technicians who placed the tubes in racks, like those illustrated and described here, and laboriously performed the agitating maneuver by hand.

In my device the tray 30, and therefore the liquid disposed therein, is given a compound motion, the component elements of which comprise the tilting or oscillation of the pitman 21 about the pivot 22 as the eccentric 19 is rotated by the shaft 15 and while the end 22 of the pitman is permitted to move to and fro about the point 24 with a substantially rectilinear motion of translation. I prefer this construction because of its simplicity, although it will be understood that the pivot 22 may also be mounted in any suitable horizontally disposed slot or raceway and similarly provide a suitable mounting for the same. The rotation of the eccentric 19 which tilts the pitman and tank 30 also rotates the forward end of the pitman with each revolution of the shaft 15. It will be seen therefore that my liquid container is mounted and supported on a pair of movable supports each adapted for a characteristically different movement.

In the device here shown the liquid to be agitated is preferably placed in the test tube to an elevation in the order of one-quarter inch and as a result of the operation of the motor there is imparted to the liquid a motion which I have described above as being of a compound nature resulting from movements, at any desirable speed, of translation, tilting and rotation. It will be understood, however, the liquids may be placed directly in the tank 30, and the same covered or not as desired, depending upon the size thereof and the quantity of liquid being agitated. When

a tank or liquid container 30 of any suitable size and shape is provided with a close fitting cover, and suitably used in a device embodying my invention, I have discovered that the same is then admirably adapted for use as a washing machine for clothes, because of the nature of the gyrations which are imparted to the contents of such a container when the same is in motion.

While I have now described what seems to be a preferred embodiment of my invention it is conceivable that various modifications in the configuration, composition and disposition of the component elements making up the same as a whole, may occur to those skilled in the art as a result of my teachings here. Accordingly, no unnecessary limitation of my invention is intended by the phraseology of the foregoing description or the illustration of said preferred embodiment.

What I claim is:

A selective agitator for test tubes comprising a liquid container having means for supporting test tubes at various positions therein, a pair of movable means supporting said container adjacent opposite ends thereof, one of said supporting means being a pivot mounted for a simultaneous movement of translation and oscillation adjacent one end of the container and the other being a crank means mounted for a movement of rotation and adjacent the other end of the container, in combination with means for rotating the crank means whereby one end of said container is moved by said supporting means with a motion of translation principally and the other end with a motion of rotation principally.

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