June 20, 1961 D. P. WINKLER 2,989,061

TEST TUBE WASHER

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Fig.1

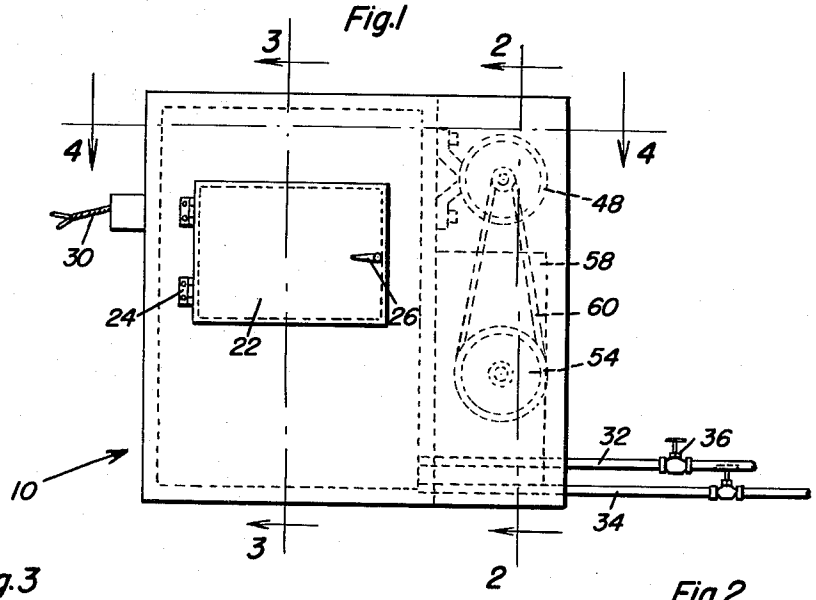


Fig.3

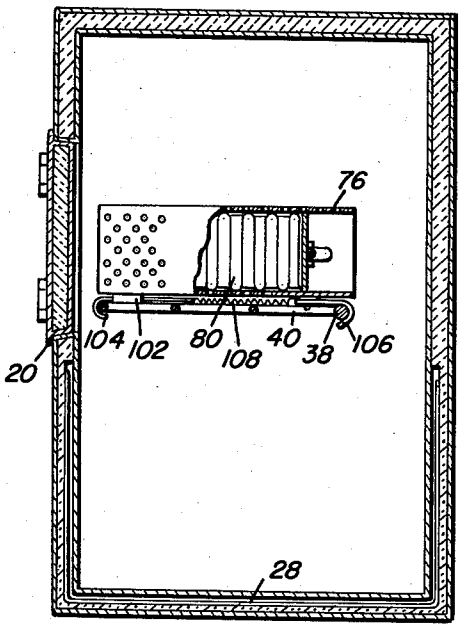
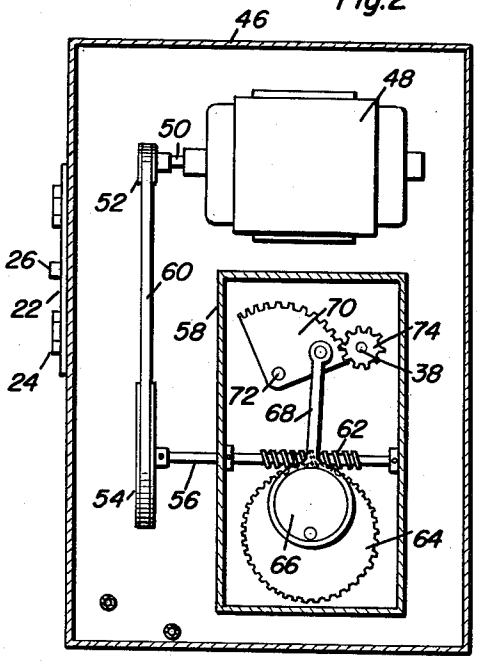


Fig.2



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Fig.4

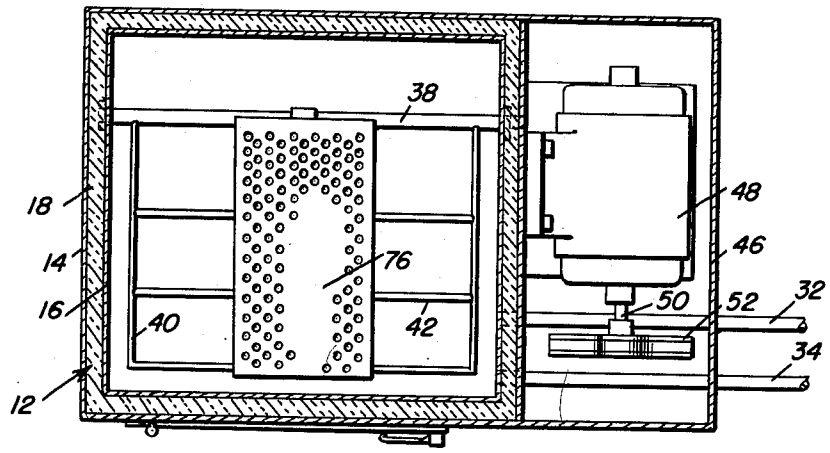


Fig.5

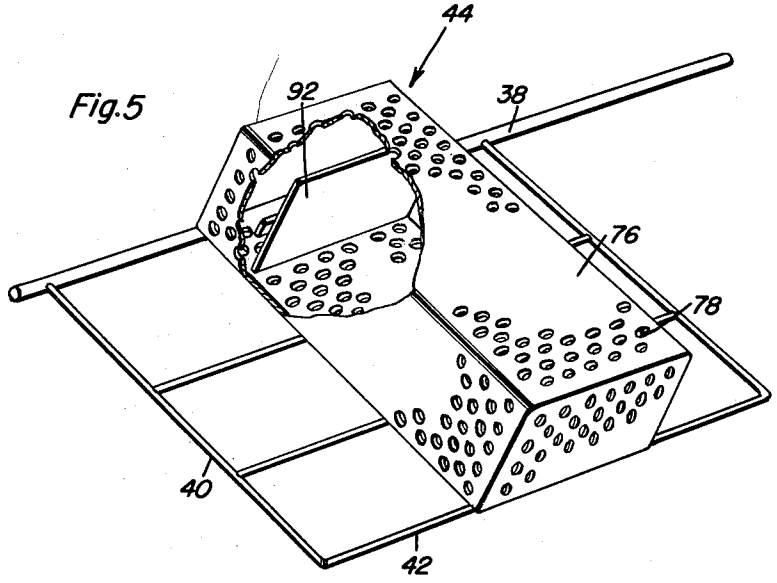
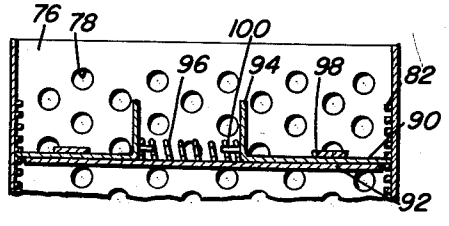


Fig.6



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2,989,061

TEST TUBE WASHER

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The present invention generally relates to a machine for washing various articles of glassware or the like used in laboratories and is especially adapted for use in washing or cleaning test tubes.

An object of the present invention is to provide a machine especially adapted for use in cleaning and washing test tubes which will raise and lower baskets of test tubes, glassware or the like in and out of a washing solution in a cyclic operation which is automatic inasmuch as the washing solution enters and is pumped out of the machine at a predetermined time which may be controlled by a timer.

A further object of the present invention is to provide a test tube washing machine incorporating means for effectively holding a plurality of test tubes for alternate submersion in a fluid cleaning solution but yet which is readily detachable for removal from the machine and provided with means for retaining any number of test tubes or similar articles in stationary position for cleaning.

Another important feature of the present invention is to provide a test tube washing machine which is extremely simple in construction, easy to use, well adapted for its intended purposes, effective for its purposes and relatively inexpensive to manufacture and maintain.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a front view of the test tube washing machine of the present invention;

FIGURE 2 is a transverse, vertical sectional view taken substantially upon a plane passing along section line 2—2 of FIGURE 1 illustrating the details of the drive mechanism for the washing machine;

FIGURE 3 is a transverse, vertical sectional view taken substantially upon a plane passing along section line 3—3 of FIGURE 1 illustrating the details of the cabinet for the washing machine together with the test tube holding basket and the manner of attaching it to the swingable supporting rack;

FIGURE 4 is a plan sectional view taken substantially upon a plane passing along section line 4—4 of FIGURE 1 illustrating further structural details of the washing machine;

FIGURE 5 is a perspective view of the supporting rack with the test tube basket mounted thereon with a portion of the basket being broken away showing the adjustable closure top; and

FIGURE 6 is a detailed sectional view of the test tube basket illustrating the specific construction of the closure top and the manner of adjustment thereof.

Referring now specifically to the drawings, the numeral 10 generally designates the test tube washing machine of the present invention which includes a generally hollow cabinet designated by the numeral 12 which includes a bottom, top, side, rear and front walls each of which is constructed of two spaced walls designated by the numeral 14 and 16 with insulation material 18 therebetween. An access opening 20 is provided in the front wall and a closure door 22 therefor is provided for the access opening and the door 22 is hingedly connected to the side edge of the opening 20 by a pair of hinges 24 and is retained in closed position by a latch 26. Disposed between the double walls 14 and 16 is a heater element 28 which may

be of any conventional construction and which may conveniently be a resistance type of heater element connected to a source of electrical energy by virtue of an electrical conductor 30. The heating element 28 is disposed adjacent the inner wall 16 for heating a washing solution or water within the cabinet 12. For supplying water or cleaning solution to the cabinet 12 is an inlet line or conduit 32 and an outlet line or conduit 34 each of which are provided with control valves 36.

Mounted between the side walls of the cabinet 12 is an elongated shaft 38 which extends through one side wall and is provided with a free end journaled in the other side wall. Rigid with the shaft 38 is a pair of radially extending parallel support members 40 interconnected by a plurality of rods or wire members 42 parallel to the shaft 38 thus providing a wire rack for supporting a basket generally designated by the numeral 44.

The end of the shaft 38 which extends through the side wall terminates in an enclosed cabinet 46 which forms a continuation of the cabinet or housing 12 and has an electric motor 48 mounted therein. The electric motor 48 is provided with a drive shaft 50 with a V-belt pulley 52 thereon which is in alignment with an enlarged V-belt pulley 54 mounted on a drive shaft 56 which is journaled in the walls of a power transmission housing 58. A V-belt 60 encircles the pulleys 52 and 54 for transmitting the rotational drive from the motor 48 to the shaft 56. The shaft 56 is provided with a worm gear 62 thereon in meshing engagement with a worm pinion 64 which is journaled between the walls of the housing 58 and has a projection 66 disposed eccentrically thereon upon which is journaled one end of a connecting rod 68. The other end of the connecting rod 68 is attached to a segmental gear 70 which is pivotally mounted on a stub axle 72 and which is in meshing engagement with the pinion gear 74 rigid with the shaft 38 thereby driving the shaft 38 when the segmental gear 70 is oscillated about the stub axle 72. Due to the eccentricity of the projection 66 and the journaling of the connecting rod 68 thereon, rotation of the gear 64 will cause oscillation of the segmental gear 70 about the stub axle 72 thus causing oscillation of the gear 74, shaft 38 and the rack defined by members 40 and 42 as well as the basket 44 thus alternately disposing the basket 44 in a horizontal position as shown in FIGURE 3 which will be above the cleaning solution and a vertical position wherein the test tubes will be immersed in a cleaning solution.

Referring now specifically to FIGURES 5 and 6, the basket 44 includes a generally rectangular hollow body 76 having a plurality of apertures 78 therein for permitting free circulation of cleaning solution. The body 76 may be of a size to receive a multiplicity of test tubes 80 therein. The interior of the side walls of the body 76 are provided with a plurality of longitudinally spaced projections 82 for receiving outwardly urged fingers 90 mounted on a closure plate 92. The fingers 90 are provided with upstanding handles 94 in perpendicular relation to the closure plate 92 and a coil spring 96 is disposed between the upstanding handles 94 for urging the fingers 90 outwardly into engagement with the lugs 82. The plate 92 is provided with upstanding loops or lugs 98 which slidably receive the fingers 90 and retain them in position and the upstanding handles 94 are provided with projections 100 which retain the spring 96 in position. Thus, it is only necessary to move the handles 94 towards each other for withdrawing the fingers 90 and causing disengagement thereof in relation to the lugs 82 thus permitting adjustment or removal of the closure plate 92 for permitting removal or insertion of the test tubes 80.

The rear wall of the body 76 is provided with a sleeve 102 slidably receiving a hook-shaped member 104 which

engages the outer rod **42**. A stationary hook member **106** is secured to the rear wall of the body **76** and engages the shaft **38**. A tension spring **108** interconnects the hook members **104** and **106** for releasably clampingly engaging the wire rack thus detachably mounting the basket on the wire rack.

With this construction, the test tubes or other articles of glassware or similar articles may be positioned within the basket **44** and the entire basket then mounted within the washing machine and the motor **48** actuated thus alternately submerging the test tubes in the cleaning solution. A timer may be used for controlling operation of the device so that the cleaning operation will automatically stop after a predetermined length of time.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A washing machine for fragile articles, comprising a housing for receiving a supply of cleaning fluid, a horizontal shaft journaled through said housing for rocking movement, an open frame rack fixed to and extending laterally from one side of the shaft, solely, for oscillation downwardly and upwardly in cleaning fluid in the housing in response to rocking of the shaft, a perforated basket for containing fragile articles, resilient means on said basket detachably attaching said basket to said shaft and rack, and power means operatively connected to the shaft outside the housing for rocking the shaft.

2. The combination of claim 1 wherein said perforated basket includes a hollow body having an open end and a plurality of perforations in the peripheral wall thereof, an adjustable and removable closure plate defining spring urged extensible fingers, lug means along the inner surface of said peripheral wall engageable by said fingers for securing said closure plate in any of a plurality of positions to seal the open end of the body for clampingly retaining a plurality of articles therein.

3. The combination of claim 1 wherein means is provided for heating said cleaning fluid.

4. The combination of claim 1 wherein said power means includes an electric motor drivingly connected with a drive gear, an eccentric on said drive gear, a connecting rod attached to said eccentric, a pivotal segment gear, said connecting rod being connected to the segment gear for oscillating the segment gear upon rotation of the drive gear, said rack including a projecting shaft, a pinion gear on said shaft in meshing engagement with the segment gear for oscillating the rack.

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