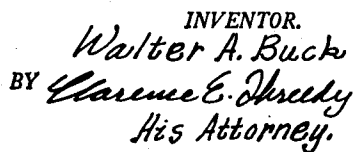


Filed Sept. 8, 1947

WATCH CLEANING APPARATUS

4 Sheets-Sheet 1



April 14, 1953

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2,634,735

WATCH CLEANING APPARATUS

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4 Sheets-Sheet 2

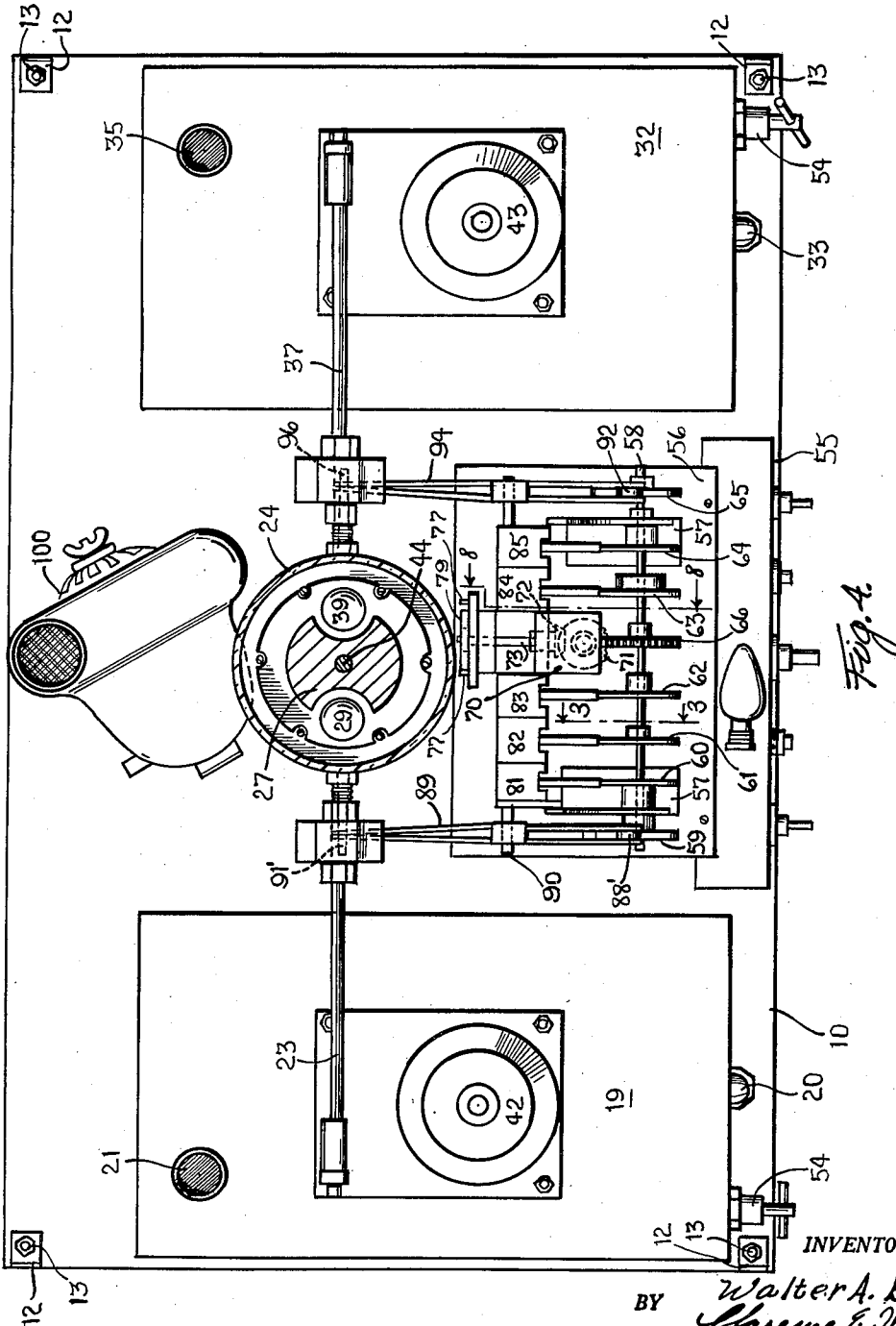


Fig. 4.

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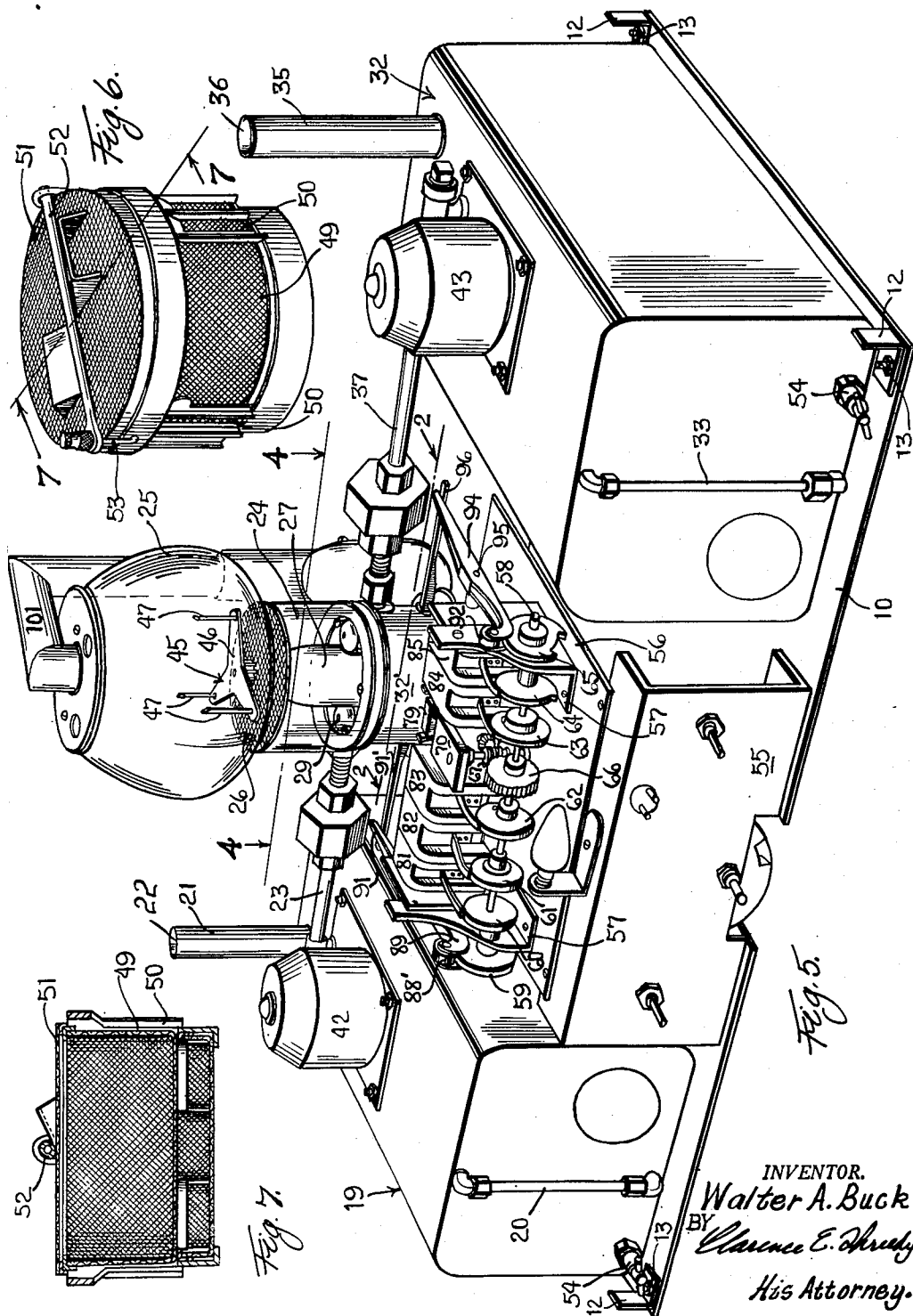
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WATCH CLEANING APPARATUS

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4 Sheets-Sheet 3



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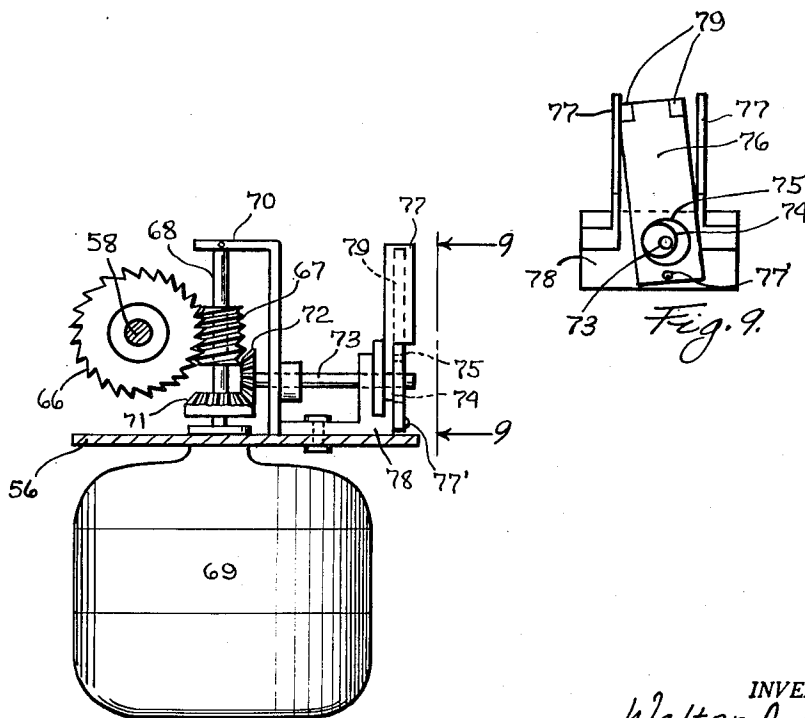
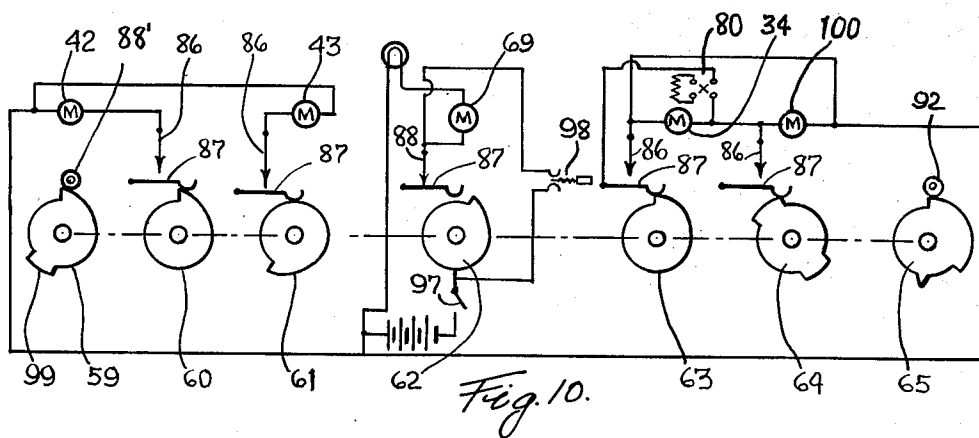
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WATCH CLEANING APPARATUS

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4 Sheets-Sheet 4



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WATCH CLEANING APPARATUS

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Application September 8, 1947, Serial No. 772,606

1 Claim. (Cl. 134—95)

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This invention relates to certain new and useful improvements in watch cleaning apparatus for cleaning separated elements of watch movements, the principal object of the invention being to provide a device which will be highly efficient in use and economical in manufacture.

Other objects of the invention are to provide in an apparatus of this character an arrangement for washing the watch elements in a cleaning fluid and thereafter subjecting the washed elements to a rinsing fluid with a final operation of drying the watch elements after the rinsing operation.

A still further and equally important object of the invention is to provide an apparatus of this character in which the above described results are accomplished in sequence by a continuously operated machine, that is, one in which it is not necessary to discontinue operation to perform the separate functions and results ascribed to it.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a perspective view of the invention;

Fig. 2 is a fragmentary elevational view taken substantially on line 2—2 of Fig. 5;

Fig. 3 is a fragmentary sectional detail view taken substantially on line 3—3 of Fig. 4;

Fig. 4 is a sectional detail view of the invention taken substantially on line 4—4 of Fig. 5;

Fig. 5 is a perspective view of the invention with the cover thereof removed;

Fig. 6 is a perspective view of the watch element carrying basket;

Fig. 7 is a sectional detail view of the same taken substantially on line 7—7 of Fig. 6;

Fig. 8 is a fragmentary sectional detail view taken substantially on line 8—8 of Fig. 4;

Fig. 9 is a fragmentary sectional detail view taken substantially on line 9—9 of Fig. 8; and

Fig. 10 is a suggested wiring diagram embodied in the invention.

The several objects of my invention are accomplished by the preferred form of construction shown in the accompanying drawings in which a mounting or base plate is indicated at 10. To this base plate there are connected in any suitable manner, resilient buttons 11 which serve to prevent marring by the base plate, of a supporting surface on which the base plate 10 is mounted.

Secured to this base plate 10 as by means of

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attaching lugs 12 and bolts or screws 13, is a cover 14. This cover 14 has a relatively square opening 15 formed in the top wall 16 thereof normally closed by a plate 17 and having an edge portion thereof terminating into a substantial circular opening 18.

Beneath the cover 14 upon the base plate 10 at one end thereof is mounted a fluid container 19 adapted to contain a predetermined amount of cleaning fluid. A suitable gauge 20 is provided on the container 19 in order to observe the amount of fluid therein. A filling spout 21 of tubular formation is provided to facilitate filling the container with the cleansing fluid. The open end 22 of this spout 21 is presented through the cover 14 and may be closed by a suitable cap (not shown).

A conduit 23 opens communication between the cleansing fluid container 19 and a filling chamber 24 on the top of which chamber is mounted a bowl 25 and between this bowl and chamber 24 is a suitable screen 26. A central core 27 is arranged in the chamber 24 and at one side of this core is a valve structure 28 including a valve head 29 actuated by a valve plunger 30 normally urged outwardly by a spring 31 to hold the valve head 29 in closed position.

This chamber 24 is mounted upon a base 32' which in turn is mounted upon a face plate 33' of

a motor 34.

Mounted on the base 10 on the end portion thereof opposite that on which the container 19 is mounted is a container 32 similar to the container 19 and adapted to contain a rinsing fluid. That the contents thereof may be observed, there is provided a suitable gauge 33 similar to the gauge 20.

Both of the gauges 20 and 33 are visible through sight openings 34 formed in the front wall 35' of the cover 14.

A tubular filling spout 35 similar to the spout 21 communicates with the container 32 and the open end 36 thereof is presented through the top wall 16 of the cover 14 and may be closed by a suitable cap (not shown).

The container 32 has communication with the chamber 24 by means of a conduit 37, passage through which is controlled by a valve structure 38. This valve structure 38 includes a valve head 39 operated by a plunger 40 moved outwardly by a spring 41 to yieldably hold the valve head 39 in closed position. This valve structure may be of any approved construction.

The fluids from the containers 19 and 32 are delivered under pressure to the chamber 24 and

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thence into the bowl 25 by means of suitable motor driven pumps 42 and 43, respectively, of any approved construction.

The shaft 44 of the motor 34 extends through the core 27 into the bowl 25. On this shaft 44 within the bowl 25 and rotatable with the shaft is a cradle 45. This cradle comprises a base plate 46 upwardly from which extend retainer pins 47 which are adapted to retain on the base 46 a basket 49 within which the watch elements are confined during treatment by the apparatus. This basket 49 provides a plurality of vertically extending grooves 50 into certain of which the pins 47 are adapted to be confined. The basket 49 comprises a cover 51 normally latched in closed position by a latch bar 52 and nut bearing latch pin 53 the arrangement being such that when the nut of the pin 53 is removed the bar 52 may be moved to permit removal of the cover 51. If desired, this cover may be hingedly connected to the body of the basket and any approved latch employed.

Each container 19 and 32 provides a drain valve 54 of any suitable construction, by means of which the contents of the containers 19 and 32 may be drained, there being suitable recesses 55' formed in the front wall 35' of the cover 14 to accommodate these valves.

Mounted on the base plate 10 is a vertical plate 55 and extending horizontally from this plate 55 is a supporting plate 56. On this supporting plate 56 there are carried spaced bearing brackets 57 in which is journaled a cam shaft 58. On this cam shaft 58 are mounted cam discs 59, 60, 61, 62, 63, 64, and 65. Fixed to the shaft 58 is a driven gear 66 which meshes with a worm gear 67. The gear 67 is fixed to a shaft 68 of a motor 69. This shaft 68 is journaled in a bracket 70.

Fixed on the shaft 68 is a bevel gear 71. This gear 71 meshes with a bevel gear 72 fixed to a shaft 73 journaled in the bracket 70. This shaft 73 has a cam 74 fixed thereto and this cam 74 works in a cam slot 75 formed in a plate 76 of non-conductive material. The plate 76 is pivoted at 77' to a bracket 78. This plate carries contact clips 79 which alternately engage conductor fingers 77 which control the reversing circuit 80 of the motor 34.

Mounted on the plate 56 are a plurality of switch structures 81, 82, 83, 84 and 85 each of which includes a fixed contact finger 86 and a movable contact finger 87. The movable contact fingers 87 operatively engage the adjacent cams 60, 61, 62, 63, and 64 arranged upon and fixed to the shaft 58.

The cam 59 is engaged by a roller 88' carried at one end portion of a fulcrum arm 89 pivotally supported as at 90. The inner end portion 91 of this arm engages a pivotally supported lifting arm 91' which in turn engages the spring controlled plunger 30 of the valve structure 28.

The cam 65 engages a roller 92 pivotally carried at one end of a fulcrum arm 94 pivotally supported as at 95. The opposite end of this arm 94 engages a pivotally supported lifting arm 96 which engages the spring controlled plunger 40 of the valve structure 38.

Fig. 10 discloses the various cams 59 to 65 inclusive in their initial starting position. In the circuit illustrated in Fig. 10 is a main control switch 97 of any approved construction. The circuit also includes a starting switch 98 of any approved construction.

To complete a circuit to the motor 69 which drives the shaft 58 the switch 97 is closed and

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the starting switch held closed until the cam 62 actuates the adjacent switch arm 87 to move the same into contact with the arm 88. Rotation of the motor 69 will continue through one complete cycle of rotation of the cam 62. At the start of this rotation the cam 59 acts upon the roller 88' and pivots the lifting lever 91' to open the valve structure 28 to permit the admission of the cleaning fluid to the bowl 25. Substantially simultaneously with this operation of the cam 59, the cam 60 completes a circuit to the motor 42 and operation of this motor 42 will pump the cleaning fluid into the bowl 25. Prior to this time the basket with the watch elements to be cleaned and washed is positioned upon the cradle 45 within the bowl 25. When the cam 59 has rotated a predetermined distance the valve structure 28 will be closed and cam 63 is now operative to complete a circuit to the reversing circuit of the motor 34 to effect a reversing rotation of the basket.

The next step in the operation of the device is draining of the fluid from the bowl 25 after the reversing rotation of the basket has terminated within the fluid. This draining of the fluid takes place upon the engagement of a hill 99 of the cam 59 with the roller 88' which again effects opening of the valve structure 28 for the purpose stated.

Just prior to closing of the valve structure 28 the circuit to the motor 34 for rotation in one direction only will be completed by action of the cam 64 whereby to throw off cleansing fluid from the watch elements. After this operation has taken place the cam 65 will engage the roller 92 to effect opening of the valve structure 38 and substantially simultaneously with this operation the circuit to the motor 43 is completed by action of the cam 61 whereby to force the rinsing fluid from the container 32 into the bowl 25.

After the valve structure 38 has been closed by action of the cam 65 the basket is again rotated in reverse direction by action of the motor 34, the circuit of which is controlled by the cam 63. Upon completion of this rinsing operation the valve structure 38 is re-opened by operation of the cam 65 to permit the fluid to drain from the bowl 25 and during this opened condition of the valve structure 38 the basket is rotated in one direction to throw off any and all excess fluid. Thereafter upon closing of the valve structure 38 the watch elements are subjected to a drying operation while the basket is rotated in one direction under the control of the cam 64. This drying operation is accomplished as follows:

A drying motor 100 is rendered operative by this cam 64 and the heated air therefrom is conducted through a conduit 101 into the bowl 25. This operation continues until the cam 64 has completed a predetermined cycle of movement. Upon completion of this operation the cam 62 will have completed its cycle of rotation at the completion of which the circuit to the motor 69 is terminated and the apparatus then becomes dormant ready for a complete new cycle of operation in the manner hereinbefore described by the closing of the starting switch 98.

From the foregoing description it is apparent that I have provided an apparatus for cleaning, rinsing and drying watch elements with the highest degree of efficiency and within a minimum of time and effort.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation

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and modification without departing from the spirit of the invention. I therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claim.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

A watch element cleaning apparatus comprising a bowl, a cradle in said bowl, a removable watch element supporting basket adapted to be supported in said bowl by said cradle, cleaning fluid delivery and draining means for said bowl, means for timing the period of operation of said cleaning fluid delivery and draining means, means for delivering to and draining from said bowl a rinsing fluid, means for rotating and reversely rotating said cradle in said cleaning and said rinsing fluid, means for timing the period

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of operation of said rotating means, means for timing the period of operation of said rinsing fluid delivery and draining means, means for rotating said cradle in one direction only while out of the liquid, means for timing the operation of said last named means, means for directing hot air into said bowl, and means for timing the operation of said directing means.

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