

May 12, 1959

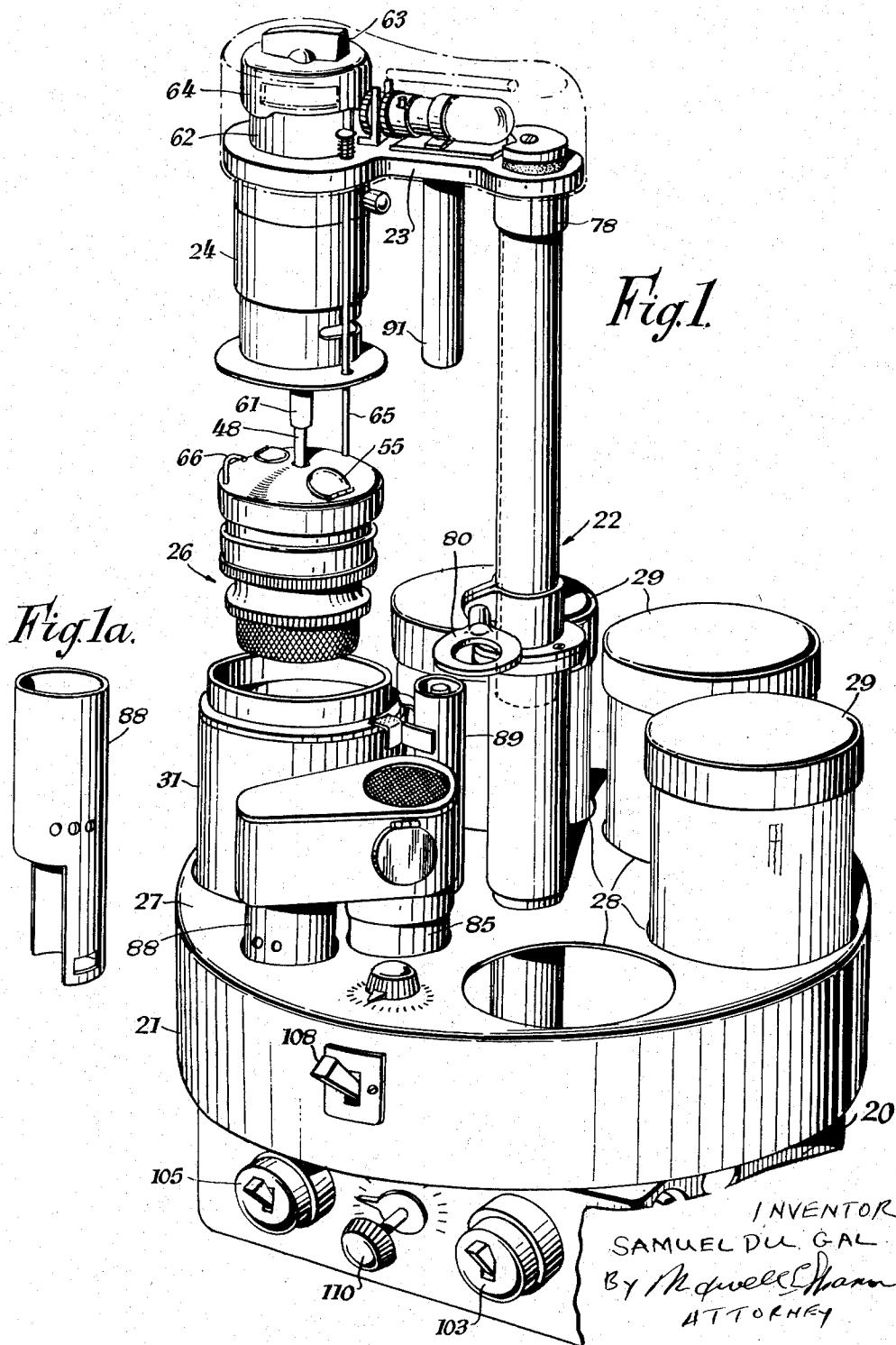
S. DU GAL

2,886,046

MACHINES FOR CLEANING WATCH AND LIKE SMALL MACHINE PARTS

Filed Aug. 10, 1954

7 Sheets-Sheet 1



May 12, 1959

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MACHINES FOR CLEANING WATCH AND LIKE SMALL MACHINE PARTS

Filed Aug. 10, 1954

7 Sheets-Sheet 2

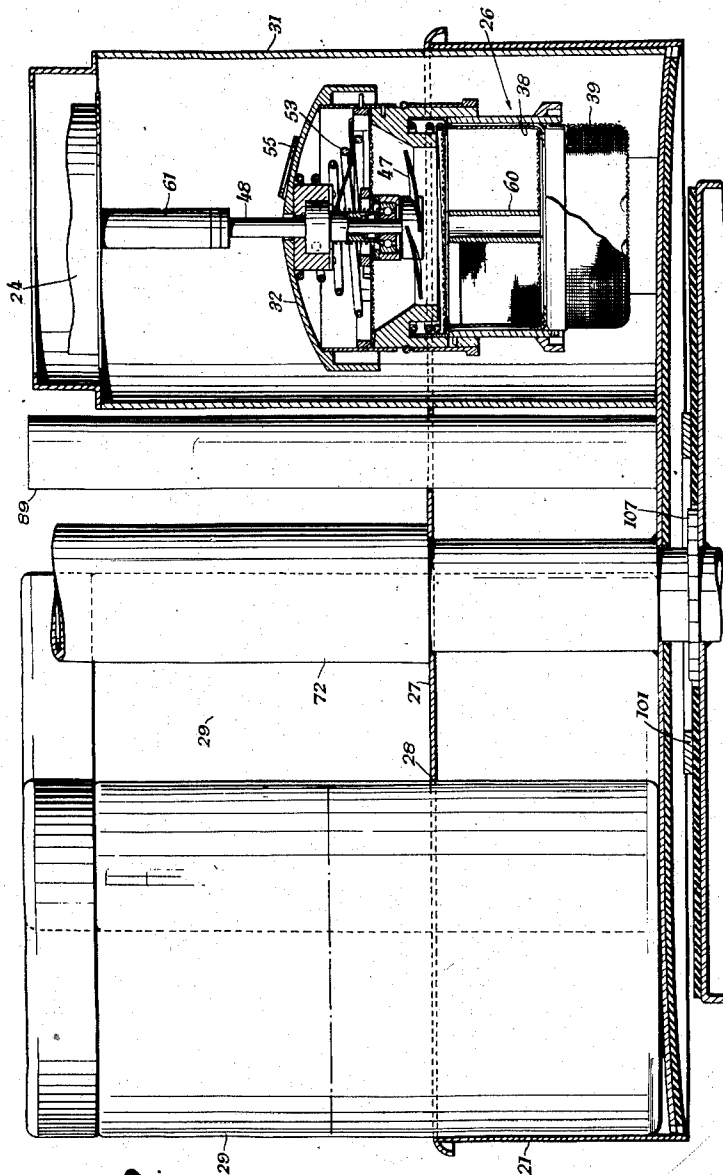


Fig. 2.

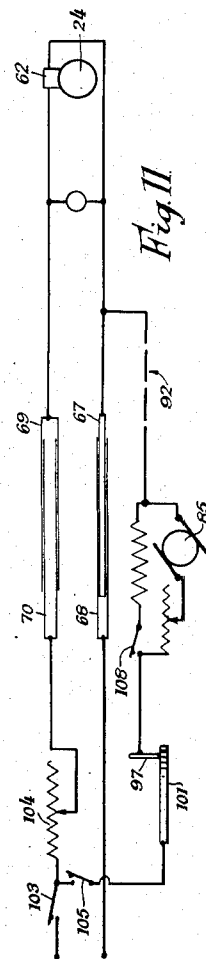


Fig. 11

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MACHINES FOR CLEANING WATCH AND LIKE SMALL MACHINE PARTS

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7 Sheets-Sheet. 3

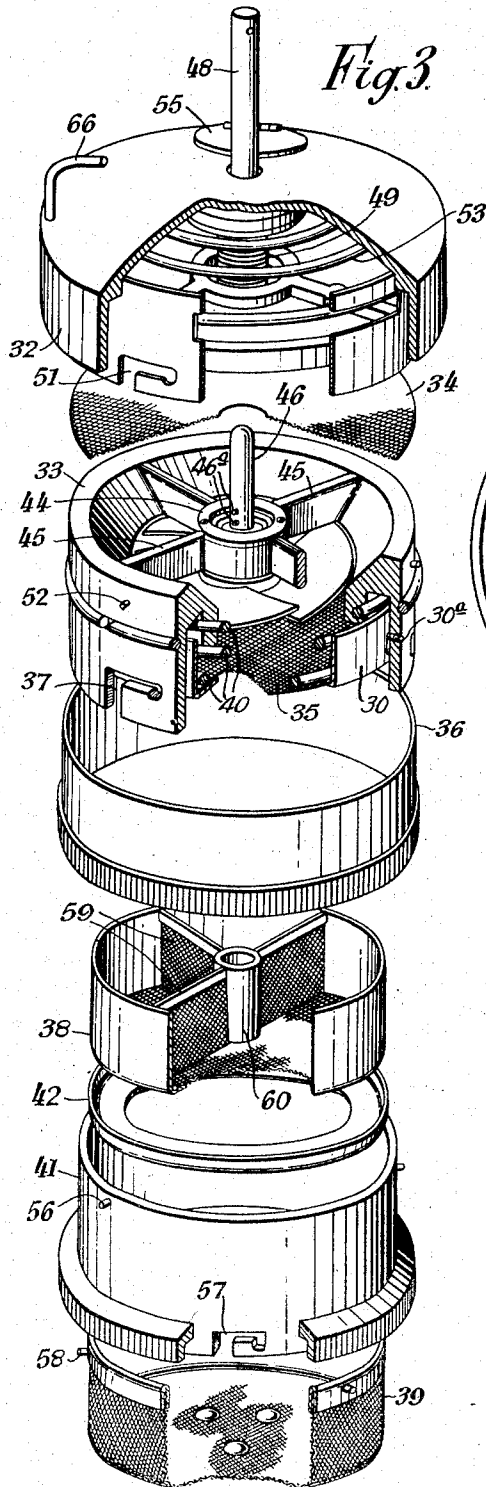


Fig. 3

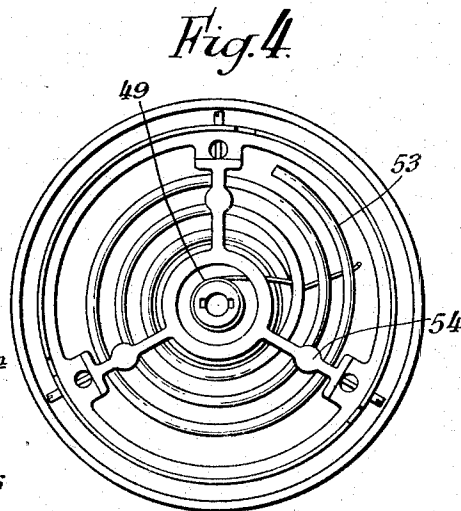


Fig. 4

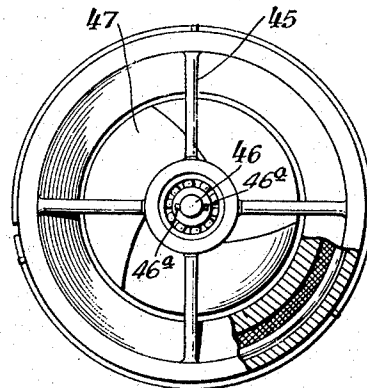


Fig. 5

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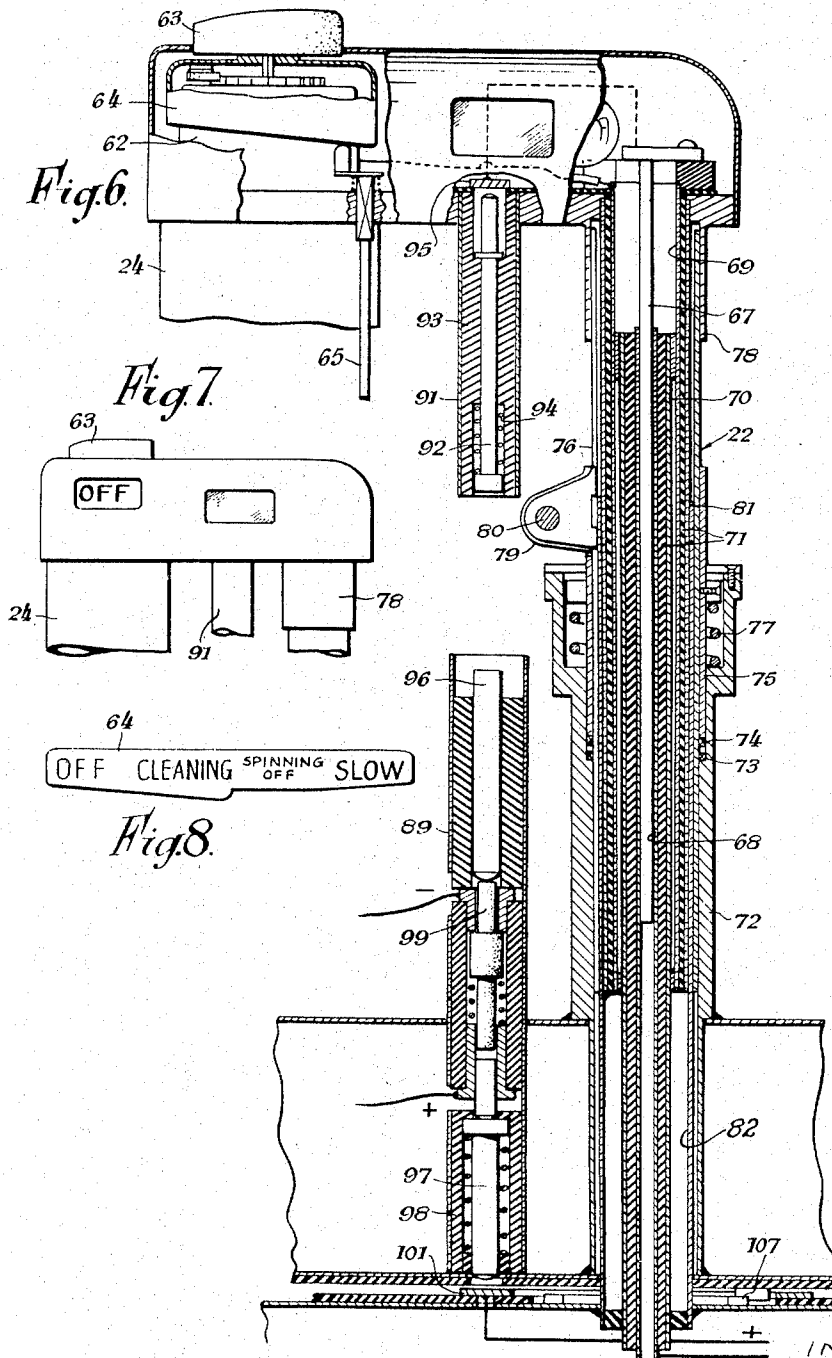
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MACHINES FOR CLEANING WATCH AND LIKE SMALL MACHINE PARTS

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7 Sheets-Sheet 4



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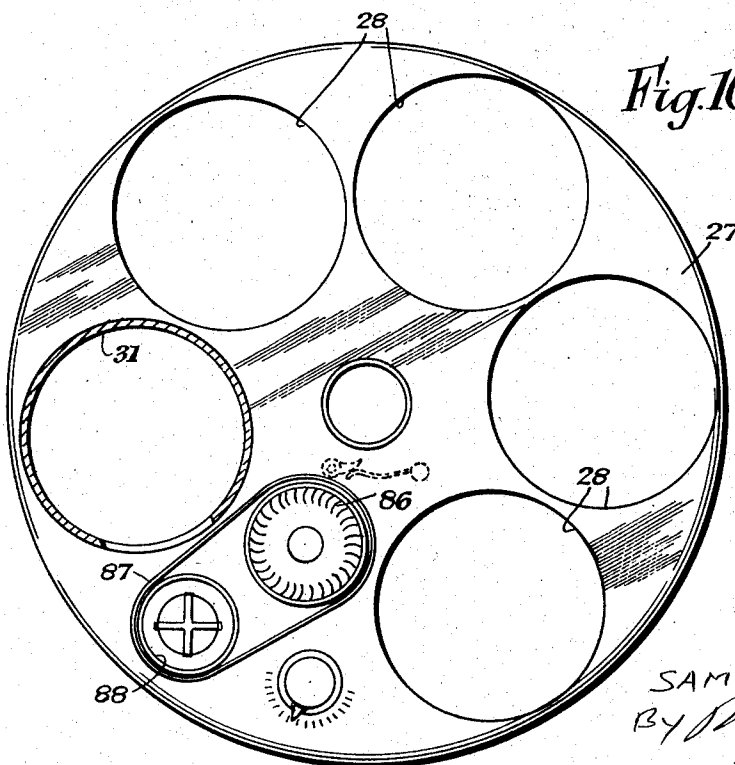
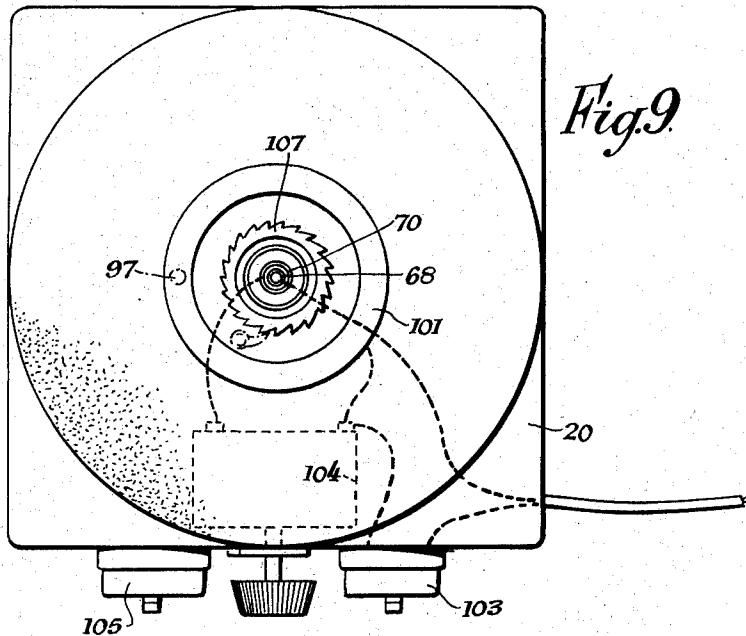
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MACHINES FOR CLEANING WATCH AND LIKE SMALL MACHINE PARTS

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7 Sheets-Sheet 5



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2,886,046

MACHINES FOR CLEANING WATCH AND LIKE SMALL MACHINE PARTS

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7 Sheets-Sheet 6

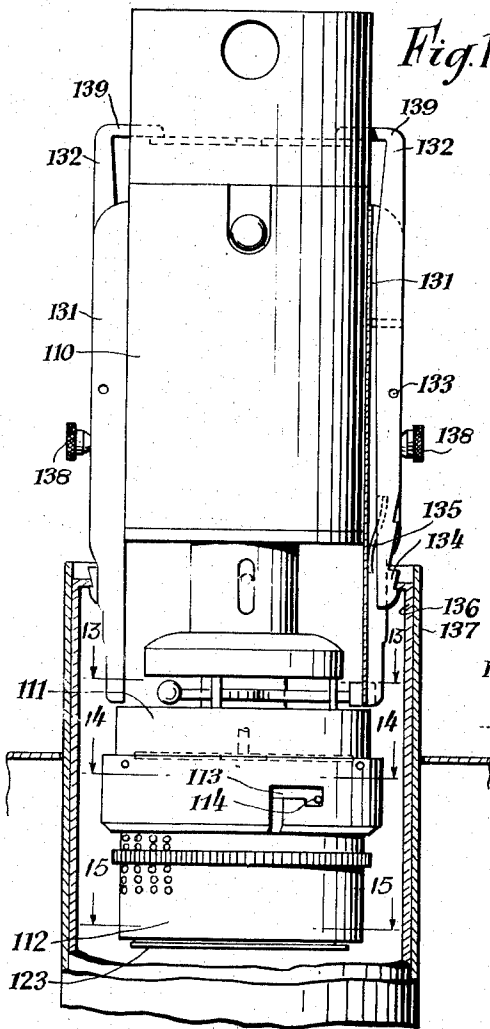


Fig. 12.

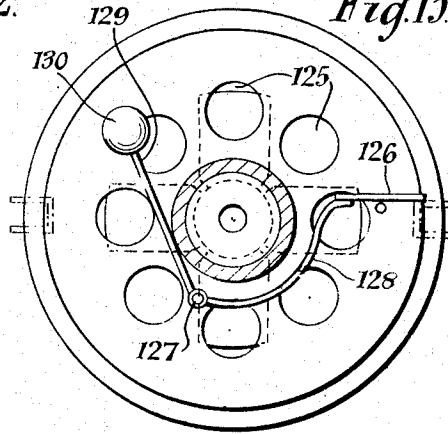


Fig. 13.

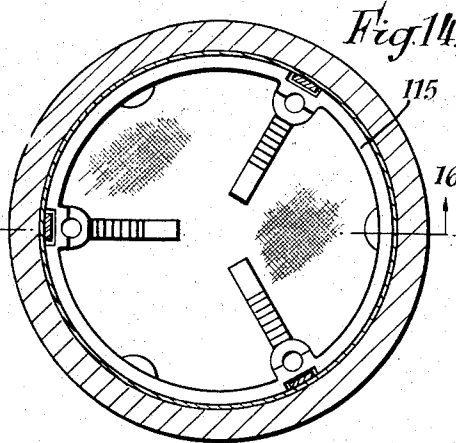


Fig. 14.

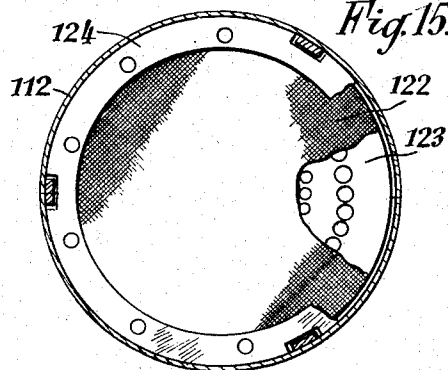


Fig. 15.

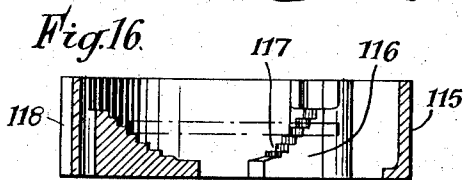


Fig. 16.

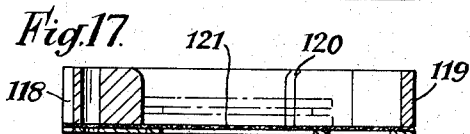


Fig. 17.

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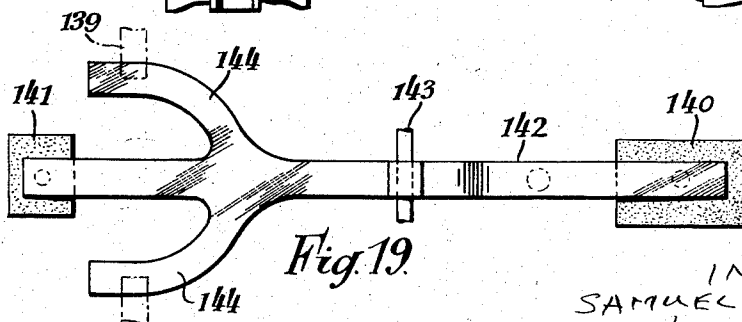
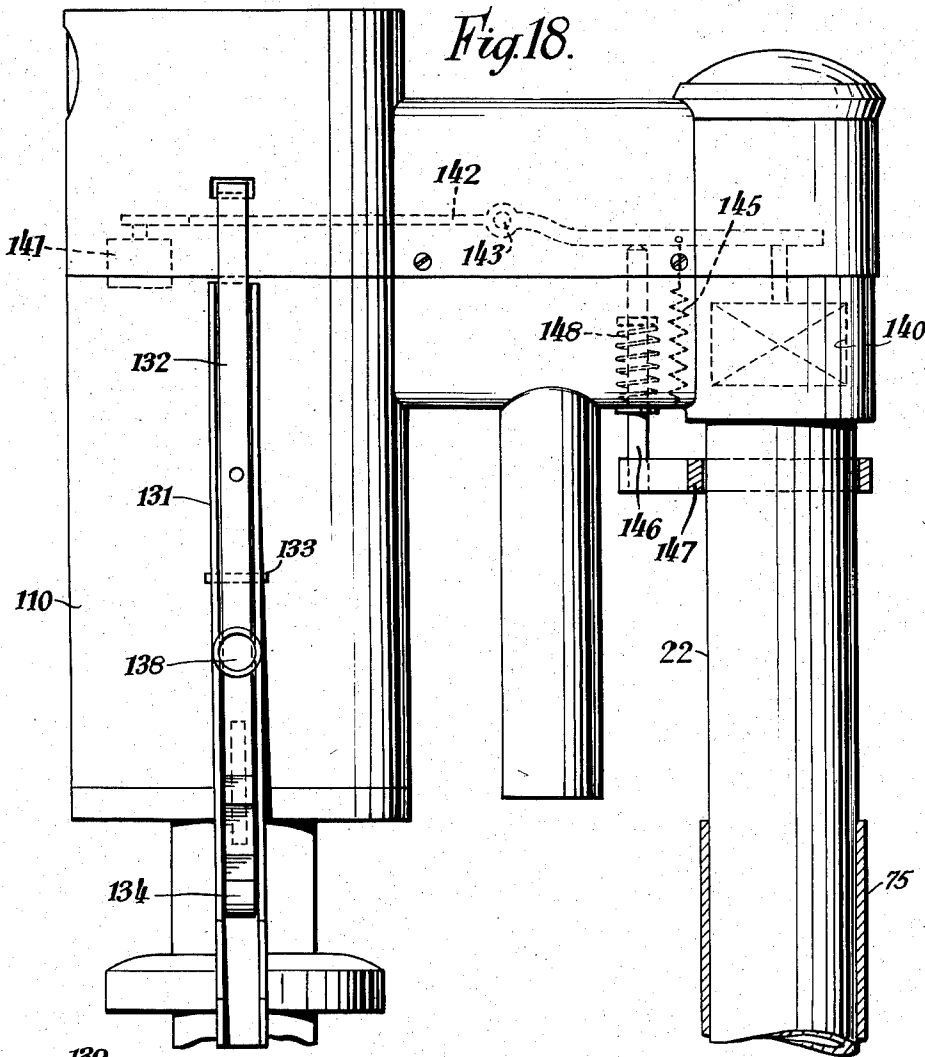
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MACHINES FOR CLEANING WATCH AND LIKE SMALL MACHINE PARTS

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7 Sheets-Sheet 7



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1

2,886,046

MACHINES FOR CLEANING WATCH AND LIKE
SMALL MACHINE PARTS

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Application August 10, 1954, Serial No. 448,889

13 Claims. (Cl. 134—58)

This invention relates to machines of the kind for cleaning parts of watches and like small mechanisms in which the watch or like parts are placed in a basket and immersed in a container of cleaning liquid. An object of the invention is to provide a machine that facilitates successive treatment of the watch or like parts in different cleaning liquids and finally removes all trace of the liquids from the watch parts. A further object of this invention is to provide a machine of the kind referred to where cleaning operations in the liquid may be efficiently carried out and subsequently the liquid may be efficiently removed from the watch or like parts and the basket. Efficient removal of the liquid is an essential where cleaning is carried out in a number of successive liquids in a predetermined order to prevent contamination of one liquid by a liquid used earlier in the sequence.

A further object is to provide a machine of the kind referred to which may be fixed in position and yet be operable from a number of different positions.

In a machine of the kind referred to the present invention is characterised by providing a base movably angularly about vertical axis, a telescopic column extending from said base coaxially with the said vertical axis, an arm extending laterally from the upper end of said column for angular movement about said column, a rotatable basket carried on the said arm to receive the machine by parts to be cleaned and a plurality of containers carried by said base and spaced equidistantly from said vertical axis such that the basket may be lowered into any container. By this means the base or the arm may be rotated relatively to the support on which the machine is mounted in order to lower the basket into any desired container. The machine may be used by a number of operators, for example, in a watch repairing establishment. The machine may be mounted so that it can be approached by an operator from any position and the rotatable base and the rotatable arm moved round so that the cleaning operation may be carried out in a manner convenient to any operator.

In order that the invention may be clearly understood one embodiment thereof is described with respect to the accompanying drawings, in which:

Figure 1 is a perspective view of the complete machine, the basket being in its raised position;

Figure 1a is a perspective view of the removable heater casing;

Figure 2 is a cross section through the lower part of the machine showing the basket in cross section in the drying container;

Figure 3 is an exploded view of the basket assembly showing the assembly of parts that make up the basket;

Figure 4 is a plan view of the upper part of the basket;

Figure 5 is a plan view of the impeller on housing located in the basket;

Figure 6 is a cross sectional view of the pillar carrying the basket and driving motor and showing the rotary electrical contact;

2

Figure 7 is an external view of the top of the pillar including the switch indicator;

Figure 8 is a development of the cam means for operating the basket stop and showing the wording as it appears thereon;

Figure 9 is a plan view of the base of the machine showing the electrical slip ring contact;

Figure 10 is a plan view of the rotary table;

Figure 11 is a circuit diagram showing details of the electrical connection;

Figure 12 is an elevation partly in cross section of a modified form of the basket, motor and liquid container;

Figures 13, 14 and 15 are cross sections on lines 13—13, 14—14 and 15—15 of Figure 12;

Figure 16 is a cross section on line 16—16 of Figure 14; and

Figure 17 is a cross section of a tray in the basket of Figure 12.

Figure 18 is a further elevation of the embodiment of Figure 12 as seen from the side; and

Figure 19 is a plan view of the switch operating arm included in the embodiment of Figures 12 and 18.

Referring initially to Figure 1, the machine comprises a square base 20 on which a turn-table 21 is rotatably mounted. Centrally of the turn-table a telescopic column 22 extends upwardly, carrying at its upper end an arm 23 from which the impeller driving motor 24 depends, this latter carrying on its downwardly extending spindle the basket generally indicated as 26. The turn-table itself is a flat cylindrical casing having in its upper surface 27 four holes 28 for the reception of four circular jars 29. These jars are intended to contain four different cleaning liquids commercially available which it is necessary to use on the watch parts in a certain order. A container 31 similar in size to the jars 29 is located in the top of the turn-table for use after the parts in the basket have been subjected to treatment in the last jar, this container being supplied with hot air to dry the basket and contents. The column 22 is also rotatable and allows of two alternative modes of operation of the machine, i.e. the turn-table may be rotated and the basket merely lifted up and down from jar to jar or the turn-table may remain fixed and the pillar rotated between the successive treatments in the jars.

It will be seen that the basket may be turned about the column so as to face an operator in any position and the base may be rotated with the basket in that position so that the basket may be lowered for treatment into the containers successively.

Referring now to Figures 3, 4 and 5, the basket is shown in great detail. It comprises a cap 32 and impeller housing 33 that includes a pair of filters 34 and 35, a ring 36 for fitting over bayonet connection 37 in the impeller housing, an upper basket 38 composed of sheet metal the bottom being of wire gauze, a lower basket 39 made almost completely of wire gauze and locking rings 41 and 42 for securing the baskets together and to the impeller housing. The impeller housing itself comprises a cylindrical metal casting 33 having a bearing housing 44 centrally positioned at one end by means of four stays 45. A spindle 46 extends upwardly from the bearing and at its lower end it carries a three-bladed screw 47 which, when rotated in its normal direction, urges the liquid downwardly. Directly under the impeller 47 a piece of coarse wire gauze 35 is mounted, to form a top to the upper basket 38 to maintain the watch parts in position. This gauze 35 is fixed in a cylinder holder 30 slidable on pins 30a fixed in the housing 33. The filter 34 normally sandwiched between the cover 32 and the housing 33 is of a fine mesh and retains the suspended matter from liquid passing through it. The cover itself carries a spindle 48 in a bearing at the top of the cover,

3

this spindle being hollow at its lower end to fit over and drive the spindle 46 carrying the impeller by means of a spline or like join. In the drawing pins 46a on shaft 46 engage a slot (not shown) in shaft 48. The lower end of the spindle 48 has a one-way clutch 49 associated therewith allowing rotation of the spindle relative to the basket to drive the impeller to cause downward movement of the liquid. The one-way clutch 49 is of a very simple nature and comprises merely a coiled wire spring around the spindle 48 such that by turning the spindle in the direction of coiling will cause the wire to tend to wind on the spindle and to grip it, whilst rotating in the other direction, i.e. the free direction, tends to unwind the coil and allows rotation with slight friction. An inner flange of the cover includes bayonet recesses 51 that co-operate with bayonet pin 52 on the bearing housing for securing the housing into the cover. A spring 53 in the cover presses down a locating spider 54 against the top of the bearing housing and holds the latter firmly whilst at the same time fixing filter 34. In the extreme top of the cover two flap valves 55 are provided lightly spring-loaded to a closed position and openable when the basket is dropped into the liquid to avoid the trapping of air in the top of the cover. The lower part of the impeller housing includes bayonet slots 37 that co-operate with pins 56 in the securing ring 41. Spring 40 in the impeller housing serves to press filter 35 on to the securing ring and to load the latter in bayonet slots 37. The securing ring 41 serves as a spacing member to carry the lower basket 39, this latter being secured to the spacing member by bayonet sockets 57 and pins 58, which latter are loaded by the action of spring 40 through basket 38. The upper basket is contained in the spacing member 41 and is retained in spaced relation from the lower basket 39 by the ring 42. The upper basket 38 is divided into three compartments by the wire gauze walls 59 and centrally of this basket a tube 60 is provided allowing some of the impelled liquid to pass directly down to the lower basket 39. When in use the more delicate of the watch parts are placed in the compartment of the upper basket 38, whilst the heavier and less easily damaged parts are placed in the lower basket 39. It will be noted that the cover 32 is domed and that it covers entirely the filter 34. The purpose of this construction is to ensure complete running off of liquid from the cover to prevent contamination of cleaning liquids used later in the order of treatment with the initial cleaning liquid. The difficulty to be overcome is that the first cleaning liquid is not miscible with the later cleaning liquids and if it were transferred it would tend to float on the surface of the later liquids. Since the first liquid is to a certain extent corrosive it will be appreciated that it is very desirable that none of this liquid should be transferred.

The passage of liquid from the container into the cover above the filter 34 is through the space between the outer flange of cover 32 and the inner flange carrying the bayonet slots 51. Slots 50 in the upper part of the inner flange allow the liquid to flow directly to the upper surface of the filter. By this arrangement the inner flange forms a cylindrical wall around the edge of the filter 34 which serves to trap suspended matter held by the filter and which would tend to leave the filter sideways during the centrifuging operation.

The entire basket is supported by the spindle 48 that is connected by a sleeve 61 to the spindle of motor 24. At the upper end of the motor 24 a switch 62 is located which acts to switch the motor 24 for rotation in either direction. The operating handle 63 of this switch includes a cam 64 of cylindrical shape, the lower edge having the cam surface. A development of this cam surface is shown in Figure 8. The cam surface co-operates with a rod 65 vertically slidable in bearings adjacent the motor 24, this rod being spring urged upwardly into contact with the cam. The lower end of this rod 65 engages a hook 66 located on the cover of the basket, the arrangement

4

being such that when the basket is in the liquid and the switch indicates "cleaning" the rod 65 is depressed to engage hook 66 and prevent rotation of the whole basket. In the position of the switch indicated by "spinning off" the direction of rotation of the motor is reversed and the rod 65 is allowed to rise to disengage from hook 66 and allow rotation of the basket.

Electric current is supplied to the switch from telescopic contacts contained in the column 22, these contacts comprising two pairs of telescoping tubes 67 and 68, and 69 and 70. These two pairs of tubes are suitably insulated one from the other by rings of insulating material 71. The lower tube of each pair is fixed to the base and is connected to the electrical supply in a manner to be described later in the specification.

In order to lock the tubular column 22 and the turn-table 21 against rotation when the basket is lowered into any of the jars the column 22 is mounted for rotation in a tube 72 extending centrally upwardly from the turn-table and interiorly of which a set of teeth 73 are formed; these teeth engage with a set of teeth 74 at the lower end of a collar 75 slidable on the column 22 and keyed thereto by means of a slot 76 extending from top to bottom of the column 22. A spring 77 located in an enlargement at the upper part of tube 72 serves to urge the sleeve 75 upwardly and holds the teeth 74 out of engagement with teeth 73. When the basket is lowered into a jar a shoulder 78 at the upper end of column 22 engages with the upper end of the sleeve 75 and causes the teeth 74 to engage the teeth 73. A pair of ears 79 located at the upper part of sleeve 75 are locked together by a thumb-screw 80 so that the column is locked in its lower position. When the thumb-screw 80 is tightened it performs two functions; firstly it locks the sleeve 75 in its lower position so that the teeth 74 and 73 are engaged and secondly it closes the upper bifurcated end 81 of a tube 82 extending upwardly from the base. By clamping on this bifurcated end 81 the column 22 is gripped and held in its lower position and is locked against rotation relative to the base. Also the sleeve 75 will be locked against rotation and the engagement of the teeth 74 and 73 will thus ensure that the turn-table itself is locked against rotation.

For operation by the method of rotating the turn-table between successive stages of treatment the basket and column 22 are merely lifted up to allow rotation of the table and the basket, of course, is lowered into the next successive jar, the whole being entirely locked against rotation by clamping action of the thumb-screw 80 when the column 22 and the basket are pushed into their lower position.

The final stage of the cleaning treatment is drying by means of hot air and in this case the basket is lowered into the container 31. In this position provision is made automatically to switch into circuit a blower motor 85 which operates a small centrifugal fan 86 in a casing 87 which feeds into an easily removable tube 88 (see Figure 1a) containing a heater element. The lower part of the tube 88 is partly cut away and feeds by a suitable channel into the lower part of the container 31. The automatic switching means comprises a pair of telescopic tubes 89 and 91, the tube 89 being secured to the turn-table and the tube 91 being secured to the arm 23 at the top of column 22; the arrangement is such that when the basket is in position over the container 31 the tubes 89 and 91 are axially aligned and when the column is lowered the tube 91 will enter the tube 89. Internally of the tube 91 a contact rod 92 is carried in an insulating mounting 93, it being slidable axially against the compression of spring 94 so that only when the rod 92 is pushed upwardly will it become connected to the electrical supply circuit. This connection is effective at its upper end with a contact 95 carried by the arm 23 and in connection with the main supply by means of the telescopic connections in column 22. In the lower tube

89 a contact rod 96 is mounted for slight endwise movement so that its upper end may contact the end of rod 92 when the tube 91 enters tube 89. A connection extends from this contact 96 to the blower motor and heater. In the lower end of the tube 89 a second spring loaded contact 97 is mounted in an insulating mount 98 adapted to contact a slip ring on the upper surface of the base when a slight endwise pressure is applied from contact 96. A connection from the contact 97 is taken to the blower motor and heater and completes the circuit to the main supply. The contact 96, of course, does not axially touch the contact 97 electrically but the pushing movement is applied to a piece of insulating material 99. In this way there is absolutely no electrical connection made to the blower motor and heater or to the open ends of contacts 92 or 96 until the basket actually enters the container 31 causing the tube 91 to enter the tube 89.

The base 20 on which the rotatable parts of the machine are mounted has the lower ends of the tubes 68 and 70 secured in insulating mounting to extend axially of the column 22, the co-operating tubes 67 and 71 being fixed in the upper end of the column itself as previously described and allowing of rotation of the column. A slip ring 101 mounted on an insulating mount on the top of the base is adapted to be contacted by the lower end of contact 97 for the supply of electricity to the blower motor and heater. A switch 105 in series with the slip ring 101 controls the supply of electricity to the blower motor and heater when the basket is in the container 31 and the tube 91 has entered the tube 89 and the contacts 96 and 92 are depressed.

In operation the watch parts to be cleaned are packed in the baskets 38 and 39, the more delicate parts being placed in the upper basket to prevent any great amount of movement in the basket. The baskets are then connected together by means of the various bayonet joints and take up the position shown in detail in Figure 2. The jars 29 will contain the respective cleaning liquids, each jar having sufficient of the liquid to cover the basket. As will be seen from Figure 2, the jars 29 are of sufficient depth so that the basket may be entirely immersed in the liquid contained in the lower half thereof, the space in the upper half of the jar being used to collect liquid thrown from the basket in the centrifuging operation. The basket is then lowered into the first jar 29 so that it is completely immersed in the contained liquid and the switch 62 controlled by handle 63 is moved so that the word "cleaning" appears in the window of the cover at the top of the column 22. The motor will then start to rotate in the direction that causes the impeller 47 to drive the liquid downwardly into the basket containing the watch parts. The basket itself will be held against rotation by engagement of rod 65 with hook 66, the motor 24 will then be left running for a time dependent on the chemical composition of the liquid and other requirements for cleaning. The fact that the impeller 47 is located above the basket ensures that there is a minimum of disturbance at the bottom of the jar where the heavier matter removed from the watch parts will tend to settle. At the finish of this time the motor 24 is switched off by operation of the main switch 103, the column 22, motor 24 and basket 26 are raised together to a position where the basket is located in the upper half of the jar and the switch handle 63 is moved to the "spinning off" position. Switching on the main switch 103 will then cause the motor to begin to rotate in the opposite direction to its previous rotation. The fact that the switch handle 63 is in the "spinning off" position will have moved the cam 64 to a position allowing the rod 65 to rise and to clear the hook 66 whilst, of course, switch handle 63 merely effects reversal of the motor connections for reversing rotation. The drive to rotate the basket is obtained by the coiled spring 49, which now acts to lock the basket to the impeller

shaft. After a short time all surplus liquid is removed by centrifugal force and runs back to the main body of the liquid in the bottom of the jar. The main switch 103 is again switched off, the column 22 is lifted to its full extent and according to the desired method of use either the column 22 or the turn-table 21 may be rotated so that the basket is positioned over the next successive jar 29. The slight friction of the spring 49 prevents the basket from rotating for a long period on the motor shaft after the motor is switched off. To prevent movement of the turn-table in the wrong direction a ratchet wheel 107 is positioned on the upper surface of the base which is engaged by a pawl on the lower side of the turn-table. The cleaning and spinning off operations are repeated for each jar containing the different liquids required in cleaning and after treatment in the last liquid the basket arrives in position for drying. For this purpose the basket is lowered into the container 31, the tube 91 entering the tube 89 and operating the contacts therein to cause current to be supplied to the blower motor 85 and the heater. When contact has been established by tubes 91 and 89 the switch 105 controls the blower motor and heater, whilst switch 108 mounted on the side of the turn-table may be used to switch off the heater independently of the motor 85 to allow cold air if necessary to be blown over the basket in container 31. Normally hot air is first of all blown over the basket in container 31 and then the heater is switched off by switch 108 to blow cold air on to the basket to cool it down. Switch 63 may be placed to the "spinning off" position and the basket rotated by motor 24. The speed may be controlled by variable resistance 104 operable by a control 110 mounted in the base. The cleaning process is then finished and the watch parts may be removed from the baskets.

It will be appreciated that in each of the jars 29 the action of the impeller is to circulate the liquid to drive it directly over the various watch parts, the filter 34 ensuring that the liquid driven on to the watch parts is clear of all suspended matter. Also the filter 34 acts to collect the suspended matter in the liquid and the liquid does not become contaminated after it has been used a number of times except as regards oil or the like that actually dissolves in the cleaning liquids. It is preferable that after each set of watch parts have been cleaned the basket and impeller housing should be entirely dismantled to be cleaned, this applying particularly to the filter 34, which will retain substantially all of the non-soluble matter removed from the watch parts.

Referring now to the modified form of machine shown by Figures 12 to 19, the actual modifications to the previous embodiment are confined to the basket, the drive motor and the liquid container, the remainder of the machine being substantially as previously described. Referring particularly to Figure 12, the drive motor is shown by reference 110 and its downwardly extending shaft carries the impeller housing 111 in which the impeller (not shown) is located. As previously described, this impeller is connected to the housing by means of a clutch for rotation relatively thereto in one direction only. The basket 112 for containing the watch or like parts is attached to the impeller housing by means of bayonet slots 113 in the impeller housing engaged by pins 114 of the basket. The basket itself is a hollow cylinder of perforated metal and carries internally a plurality of trays, of which two individual types are shown in Figures 16 and 17. Referring to Figures 14 and 16, the tray comprises a metallic cylinder 115 having three inwardly directed arms 116 each having a stepped upper surface 117. This tray is intended to receive large gear wheels, the steps being intended to locate such gear wheels substantially centrally of the tray to avoid vibration due to unbalance when the whole basket is rotating. The upper and lower surfaces of the cylinder 115 are machined to be accurately flat. At one position in the

edge of the cylinder 115 a groove 118 is provided by which the tray is located against rotation in the basket. Referring now to Figure 17, a form of tray is shown for holding small watch parts and comprises an outer cylinder 119 having three short inwardly directed projections 120. The lower surface of the cylinder is closed by means of a piece of coarse wire gauze 121 so that small watch parts may rest thereon. This tray, as in Figure 16, has accurately machined upper and lower surfaces and at its edge a groove 118 for purposes of location. At the lower end of the basket itself a piece of extremely fine mesh gauze 122 is located and is supported by the perforated base 123 of the basket. This gauze 122 is locked in position by means of a locking ring 124 internally of the basket, which latter is held in position by the trays. When required for use a number of trays are inserted in the basket to a certain height and when the basket is connected by the bayonet connection 111 to the impeller housing suitable spring loading in the impeller housing acts to press the trays together so that their upper and lower surfaces make good seals one with the other, this spring loading also serving to locate the pins 114 in the bayonet slots 113. It is arranged that the tray of Figure 16 is exactly twice as thick as the tray of Figure 17 so that two of the latter trays may be substituted for one of the former trays.

At the top of the impeller housing a plurality of holes 125 are located by which cleaning liquid may enter the impeller housing. On the upper surface of the impeller housing a centrifugally operated stop 126 is pivotally mounted on pivot 127. The actual stop comprises two arms 128 and 129 extending from pivot 127 on opposite sides of the central spindle, which are arranged substantially to counter-balance one another. To this end the arm 129 has a small mass 130 located at its end which serves to counter-balance the weight of the stop 126. A pair of channel members 131 are secured to the side of the motor 110 and extend down to the level of the stop 126 for engagement thereby. In each channel member 131 a lever 132 is located, being pivotally mounted in the channel at its centre 133 to allow of slight angular movement. The lower end of each lever 132 includes ratchet teeth 134 directed outwardly and under the lower end of each lever a small leaf spring 135 is provided to urge the lower end of the lever outwardly. The ratchet teeth 134 engage with an inner portion 136 of the liquid container 137, the arrangement being such that when the basket is lowered into a container the ratchet teeth will engage the inner member of the container and when the basket is then lifted from the container the inner member will be lifted with the basket. The inner member 136 is a thin walled metal cylinder having in it the actual container 137. Two manually operated knobs 138 are secured one on each lever 132 by which the levers may be pressed together at their lower ends to release the inner member 136 of the container. The upper ends of levers 132 extend above the motor and at their upper ends each has an inwardly directed projection 139 for co-operating with switching means.

The switching means comprise a reversing switch 140 and an on-off switch 141, which are operable by means of a lever 142, which is shown in plan in Figure 19. This lever is pivoted centrally about a horizontal pivot 143 and its two extreme ends co-operate with the switches 140 and 141. At the end of the lever adjacent the motor a pair of projections 144 extend from the lever for co-operation with the projections 139 of levers 132. A tension spring 145 located in the arm-carrying motor pulls the end of the lever downwardly adjacent switch 140. Also mounted in the arm-carrying motor is a rod 146 carrying at its lower end a ring 147 surrounding the column 22, so that when the column is fully lowered this ring engages the upper edge of the tube 75 which forms a fixed part of the column. The rod 146 inside

the arm engages the lever 142 adjacent switch 140 and is spring urged upwardly into engagement with this lever by a compression spring 148. The compression spring 148 is not so strong as spring 145, so that when the ring 147 is free, spring 145 will pull the lever 142 downwardly against the spring 148, the limit of this downward movement being determined by the engagement of the projections 144 of the lever 142 with the projections 139 of levers 132. It is so arranged that the lever 142 has three effective positions, one being when the ring 147 is raised by engagement with tube 75 so that switch 140 causes the motor to rotate to drive the impeller for cleaning purposes. The second position is obtained when the basket and motor are raised, releasing the ring 147 so that the lever 142 moves to contact the projection 139. In this position the switch 140 is arranged to reverse the direction of rotation of the motor. The third position of lever 142 is obtained when the knobs 138 are pushed together to move lever 132 and pull the projections 139 to move downwardly, allowing spring 145 to pull the lever down, causing switch 141 to switch off current to the motor.

In operation the trays are filled with the various watch parts to be cleaned and are placed in the basket, which latter is then secured in position in the impeller housing. The basket is lowered into a container 137, the ratchet teeth 134 engaging the inner member 136 of the container and the ring 147 engaging tube 75 to cause movement of lever 142, this movement operating switch 141 to switch on current and 140 to set the direction of rotation of the motor for cleaning. After the cleaning has been allowed to proceed for a sufficient period the motor and baskets are raised, the ratchet teeth 134 then lifting the inner member 136 of the container. The same operation of raising releases ring 147, allowing the lever 142 to move to its second position, where it is engaged by the projections 139. In this position switch 140 reverses the direction of rotation of the motor for the spinning off action. In the cleaning stage, when the impeller housing was immersed in the liquid, any tendency for the impeller to rotate caused the stop 126 to be moved by the resistance of the liquid to an outward position about its pivot 127 to engage one or other of the channels 131 and thus prevent rotation of the basket and the impeller housing. During the spinning off action when the basket and motor are raised, rotation is in the opposite direction and impingement of air on the stop 126 will cause it to move inwardly to a position where the centrifugal action of the mass 130 will firmly hold it inwardly so that it does not contact either of the channels 131 and thus the basket and housing are free to rotate. From the position as seen in Figure 13 the direction of rotation for spinning off is clockwise, with the result that if stop 126 should contact a channel 131 further movement of the impeller housing and basket will cause the stop to pass over the channel. As soon as rotation is sufficient to give centrifugal action to the mass 130 the stop will not contact either channel. In the opposite direction of rotation for cleaning, when the stop engages a channel the slight torque exerted by the impeller on the impeller housing will hold the stop in positive engagement with the channel and prevent rotation of the basket and housing. Liquid centrifuged from the basket by the spinning off operation will be trapped on the inner surface of the inner member 136 of the container and then run downwardly into the container itself. By this arrangement it will be appreciated that the total height of the whole machine may be reduced by the fact that the containers need not be so deep as in the first described embodiment and the basket and motor need not be lifted to such a high level for moving from one container to another. When the spinning off operation is completed the knobs 138 are passed inwardly to release the inner member 136 of the container and to release the lever 142, allowing it to move

angularly to operate switch 141 to cut off electric supply to the motor, whereupon rotation will cease. The basket is then in a position to be moved angularly about the column ready for lowering into the next container in the series and for repetition of the cleaning and spinning off operations.

I claim:

1. A machine substantially as described and comprising a base, a turn-table supported on said base and disposed to rotate about a vertical axis, a telescopic column extending upwardly from said base and table and coaxially with the said vertical axis, means extending laterally from the upper end of said column for angular movement about said column, an electrical motor mounted on the said means, a rotatable basket carried on the said means to receive machine parts to be cleaned, an impeller driven by said motor and mounted adjacent said basket, a rotatable mounting for said impeller forming the sole support for the basket, switch means by which the motor may be selectively driven in either direction, locking means operatively connected with the basket to prevent its rotation in one direction and a plurality of containers carried by said turn-table and spaced equidistantly from said vertical axis, such that the said basket may be lowered into any container.

2. A machine as described in claim 1, and wherein sliding electrical contacts are interposed said base and column for the supply of electrical power to said base and column irrespective of their angular position.

3. A machine as described in claim 1 including an electrically operated dryer operatively connected with one container.

4. A machine as described in claim 1 including locking means to lock the column and table simultaneously to the base.

5. A machine as described in claim 1 and wherein a clutch is located between the impeller and the basket to drive the latter from the impeller in one direction of rotation only.

6. A machine as described in claim 5 and including locking means to lock the basket against rotation in the direction of impeller rotation when the said clutch is not in operation.

7. A machine as described in claim 6 and wherein the said locking means comprises a stop pivoted to the basket such that it is moved to engage an abutment and lock the basket by impingement of fluid thereon for one direction

of rotation and is similarly moved away from the abutment in the other direction of rotation.

8. A machine as described in claim 1 in which there is a fine filter adjacent the impeller.

9. A machine as described in claim 1 in which the locking means is switch actuated.

10. A machine substantially as described and comprising a base, a turn-table supported by said base and disposed to rotate about a vertical axis, a telescopic column vertically mounted on said base and table, an arm laterally extending from said column, an electric motor mounted on said arm, a rotary driving spindle extending downwardly from the motor parallel to said vertical axis, a reversible impeller fixedly mounted on the spindle, locking means to lock the basket against rotation, and a plurality of containers carried by the turn-table and equidistantly spaced from the column into any of which the basket may be lowered by telescopic action of the column, each container including therein a hollow cylinder sleeve, gripping means attached to said motor mounted on said arm for gripping the hollow cylinder when the basket is lowered into the container so that the hollow cylinder is raised when the basket is raised from the container.

11. A machine as described in claim 10 including switch means operable when the said column is completely lowered to rotate the motor in one direction and when the column is raised to rotate the motor in the opposite direction.

12. A machine as described in claim 10 and wherein the gripping means comprises a plurality of levers mounted on an arm, ratchet teeth on the lower ends of the levers and springs urging the levers outwardly to a limited extent at their lower ends.

13. A machine as described in claim 11 and including switch means cooperating with the gripping means to cause power to the motor to be switched off when the inner member of the container is released from the gripping means.

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