July 19, 1966 R. L. PERL 3,261,554

REVERSING SPRAY ARM

Filed June 5, 1964 3 Sheets-Sheet 1

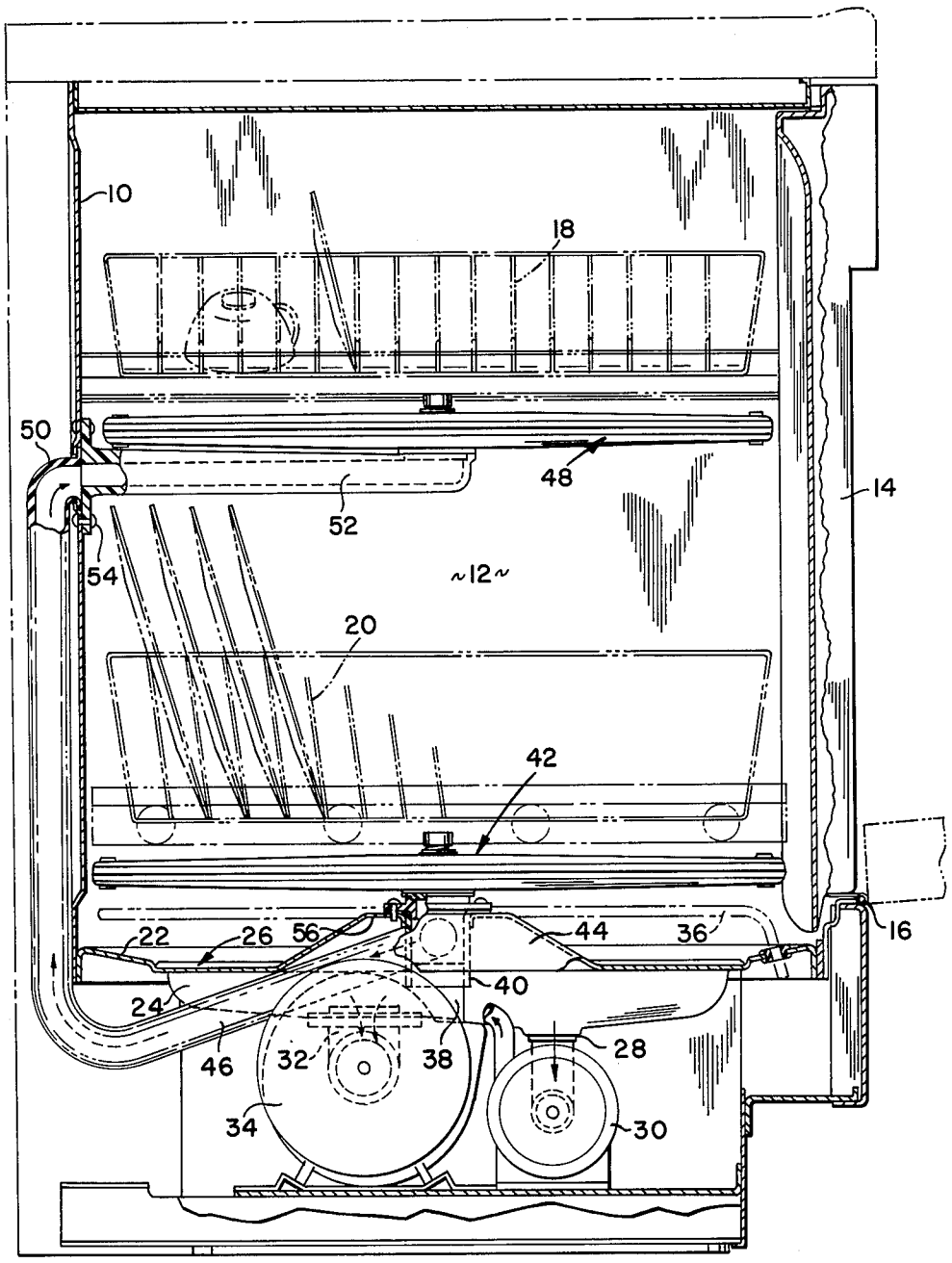

Fig. 1

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REVERSING SPRAY ARM

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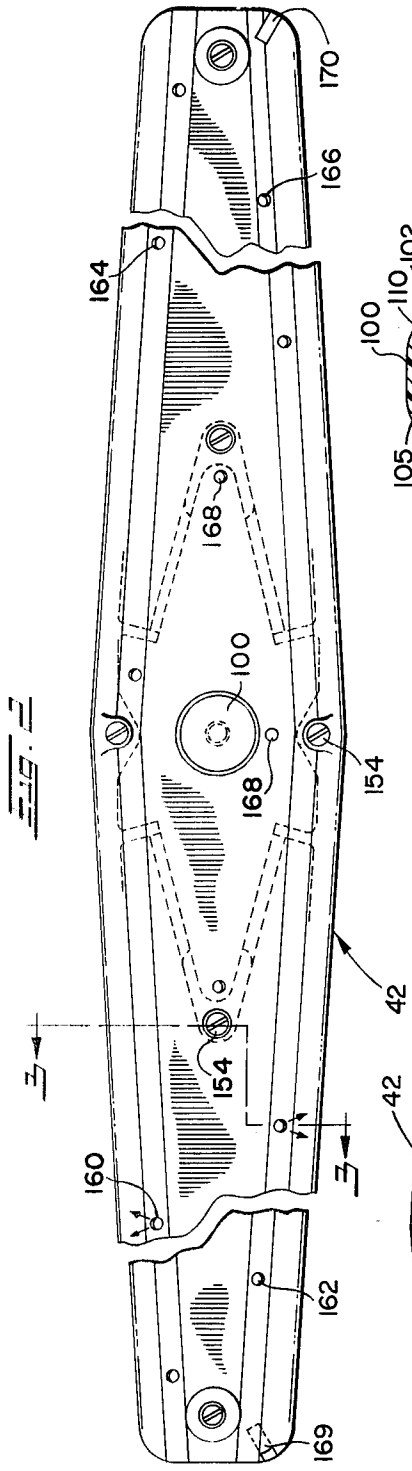

FIG. 1

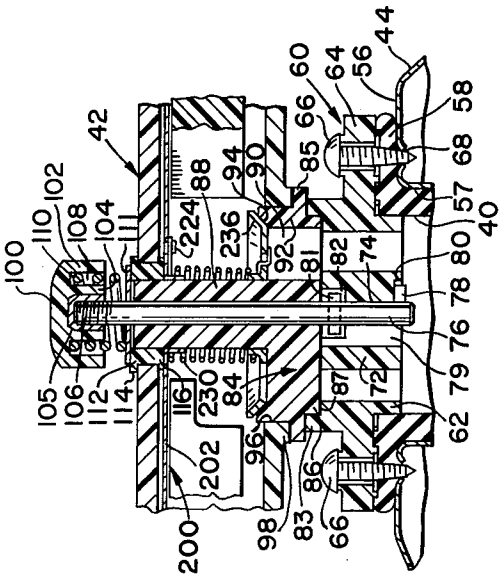

FIG. 4

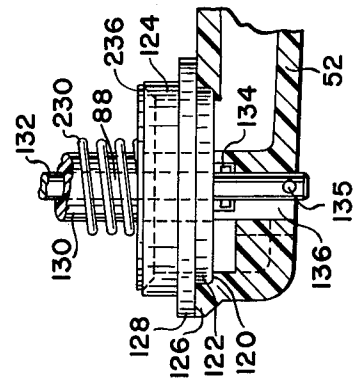

FIG. 5

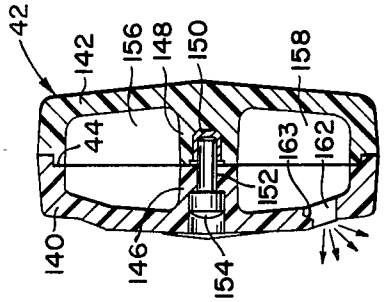

FIG. 3

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REVERSING SPRAY ARM

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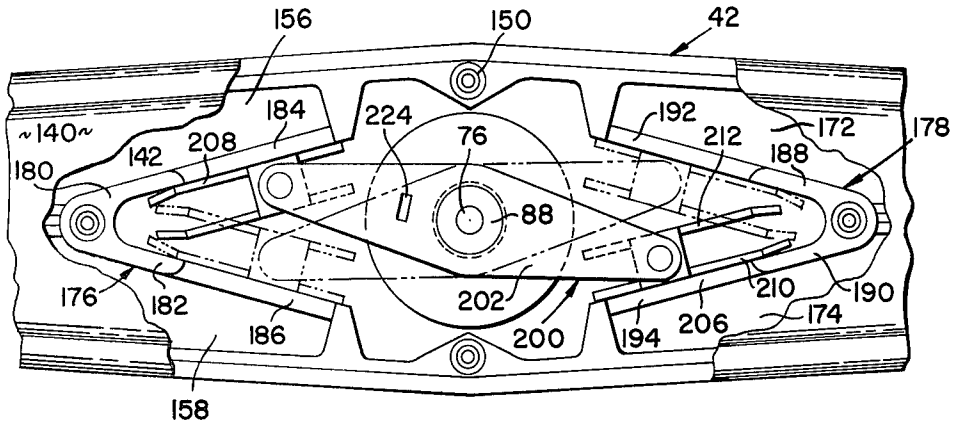
Fig. 6



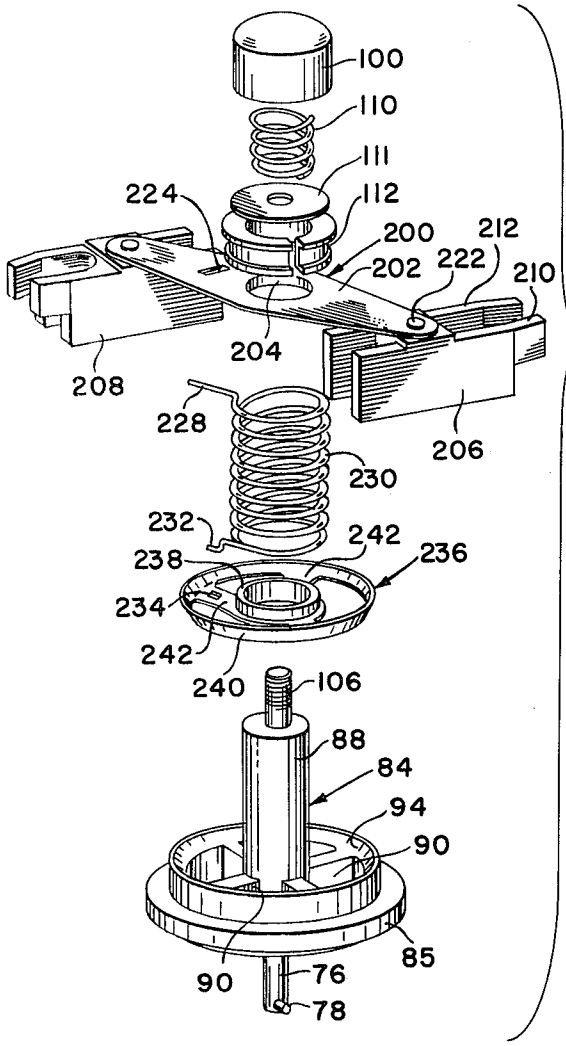


Fig. 7

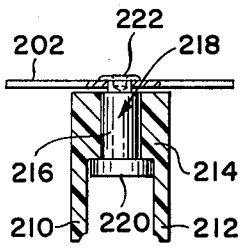


Fig. 8

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3,261,554

REVERSING SPRAY ARM

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Filed June 5, 1964, Ser. No. 372,951
10 Claims. (Cl. 239—252)

The present invention relates as indicated to a reversing spray arm and more particularly to a reversing spray arm of the reaction type for use in washing machines, e.g. automatic dish washing machines, wherein the spray arm is automatically reversed in direction of rotation during the operating cycle for effecting improved dish washing.

Presently available automatic dishwashers having reaction type spray arms, i.e. spray arms driven by a reaction force resulting from the emanation of liquid under pressure from the arm, are unidirectional thus permitting direct impingement of the washing fluid on only one side of the dishes or tableware in the washing chamber, with the result that less than satisfactory cleansing of the dishes and tableware is achieved.

A primary object of the present invention is to provide an improved spray arm of the reaction type constructed and arranged for automatic reversal in direction of rotation during the washing operation thereby more effectively cleaning the dishes and tableware in the washing chamber.

A further, more specific object is to provide a reversing spray arm which automatically conditions itself for reversal in direction of rotation upon a drop in the pressure of the liquid within the spray arm.

A further object of the present invention is to produce a novel spray pattern by providing a reversing spray arm having radially staggered drive jet means for achieving different spray patterns in each direction of rotation of the arm.

A further object is to provide a reversing spray arm which is of simple construction and economical to manufacture and maintain.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:

FIG. 1 is a side elevational view, partly broken away and sectioned, of a dishwasher having mounted therein a pair of vertically spaced spray arms constructed in accordance with the present invention;

FIG. 2 is an enlarged, fragmentary plan view of the spray arm of the invention;

FIG. 3 is a vertical sectional view taken on line 3—3 of FIG. 2;

FIG. 4 is an enlarged, fragmentary, sectional view of the lower spray arm and mounting therefor;

FIG. 5 is an enlarged, partially sectioned fragmentary view of the mounting for the upper spray arm;

FIG. 6 is an enlarged plan view of the spray arm, with the top thereof being removed to expose the valve mechanism therein;

FIG. 7 is an enlarged, exploded view of the valve mechanism and related components; and

FIG. 8 is a view showing the pivotal mounting of certain of the valve mechanism components.

Referring now to the drawings in detail, wherein like parts are indicated by like reference numerals, and initially to FIG. 1, the dishwasher incorporating the reversing spray arm of the present invention comprises a cabinet within which a tub or chest **10** is mounted to form a washing chamber **12**. The cabinet and tub are open at the front and a bottom hinged door **14** is pivotally mounted at the front of the cabinet by hinge means **16** for moving the door between a vertical, closed position and a horizontal, open position, all in a well-known manner. Although the described arrangement thus represents a dishwasher of the so-called front loading type, it will be understood that the present improvements are capable of use in other type dishwashers as well.

In the form shown upper and lower racks **18** and **20** are mounted for sliding movement on suitable supporting means mounted on the side walls of the tub **10**, the racks serving the usual function of supporting tableware, utensils and the like, all indicated by way of example in dashed lines in FIG. 1. The racks **18** and **20** are movable to positions outwardly of the washing chamber to facilitate loading and unloading thereof, in a manner well known in the art.

The bottom **22** of the tub **10** slopes downwardly to a depressed sump portion **24** which has disposed therein a filter device generally indicated at **26**, the construction of which forms no part of the present invention. The filter functions in a manner to filter out those food particles in excess of a predetermined particle size while permitting the remainder of the washing solution to be recirculated to the washing chamber. A drain pipe **28** is adapted to receive those particles not passing through the filter **26** and communicates with a drain pump **30** for pumping the oversized particles to a suitable discharge point. The solution passing through the filter passes downwardly through a recirculating drain pipe **32** to the inlet of a recirculating pump **34** the outlet of which communicates with the spray arms to be hereinafter described.

The washing chamber **12** is adapted to be filled by means of a suitable flow-regulating water fill pipe (not shown) suitably mounted on the dishwasher and communicating with the washing chamber. In order to heat the water beyond the normal hot water line temperature, and to facilitate drying of the tableware and utensils during the drying cycle, a heating element **36** is mounted in the washing chamber **12** relatively adjacent the bottom thereof.

The outlet **38** of the recirculating pump **34** is connected to a center hose member **40** through which water can be supplied to a lower spray arm generally indicated at **42**. The latter is mounted on a central elevated portion **44** of the tub bottom in a manner to be more specifically described hereinbelow. In the form shown the center hose **40** additionally communicates by means of a supply hose **46** with an upper spray arm generally indicated at **48**, the construction and operation of which is preferably identical with the lower spray arm **42**. The upper end **50** of the supply hose **46** is mounted on the back wall of the tub **10** and communicates with the upper spray arm **48** through a hollow, cantilevered arm **52** mounted on the tub rear wall by means of mounting bolts or the like **54**.

Referring now to the manner in which the lower spray arm **42** is mounted adjacent the bottom of the washing chamber, as best shown in FIG. 4, the central elevated portion **44** of the tub bottom is formed with a horizontally disposed mounting flange **56** which is centrally downwardly turned to provide a central opening **57** through which extends the center hose **40**. The latter is provided with a top, laterally extending flange **58** adapted to overlie the mounting flange **56**. A center post generally indicated at **60** is provided with a bottom portion **62** adapted to be disposed within the top of the center hose **40**, and an

intermediate, enlarged diameter flange portion **64** which overlies the center hose flange **58**. The assembly is adapted to be rigidly secured together preferably by means of self-tapping sheet metal screws **66** which extend through openings in the flanges **64** and **58** into threaded engagement with openings **68** formed in the mounting flange **56**.

The center post is substantially open at the interior thereof to permit liquid to flow upwardly therethrough. A plurality of spider connecting arms (not shown) centrally converge from the outer wall of the center post to a hub portion **72** formed with a central opening **74** through which a latch pin **76** extends. The latter is provided with a laterally extending bottom projection **78** which can be aligned with and disposed through a complemental groove **79** formed in the hub of the center post, with subsequent rotation of the latch pin approximately 180° serving to align the projection **78** with a recess **80** formed in the bottom of the center post to non-rotatably lock the latch pin in position, as will be hereinafter more fully described. The latch pin also is provided with an upwardly spaced, transverse pin **81** which extends outwardly from both sides of the latch pin and is adapted to be received in a circular recess **82** formed in the top of the center post **60**.

The top of the center post **60** comprises an annular rim **83** adapted to receive a spray arm sleeve generally indicated at **84**. The latter is provided with an annular shoulder **85** which overlies the rim **83**, and a slightly reduced bottom portion **86** which is adapted to be received on an annular shoulder **87** of the center post for properly aligning the sleeve when mounted. The sleeve **84** further comprises a cylindrical, vertically extending central portion **88** and a plurality of radially directed spider arms commonly designated at **90** (FIG. 7), the radially outer portions of which terminate in an annular outer wall portion **92**. The top surface of the outer wall portion **92** is beveled as indicated at **94** for a purpose to be hereinafter described. The spray arm **42** is provided with a bottom central opening **96** for mounting the arm around the spray arm sleeve **84**, with the arm being formed with an annular bottom shoulder **98** adapted to bear against the sleeve shoulder **85**.

To mount the spray arm **42** on the sleeve **84** for rotation relative thereto, a latch pin nut **100** is provided having an annular outer wall portion **102** and an inner tubular portion **104**, the latter being provided with a threaded insert **105** to receive the upper threaded end portion **106** of the latch pin **76**. The outer annular wall **102** and the tubular portion **104** form therebetween an annular chamber **108** which receives a coil spring **110**. The upper convolution of the latter is adapted to tightly contact the base of the latch pin nut, with the bottom convolution thereof bottoming on a metal washer **111**. The washer **111** in turn overlies the top of a plastic, split bushing **112**. The bushing **112** receives the upper end of the spray arm sleeve **84** and includes top and bottom flanges **114** and **116** spaced to receive the top wall of the spray arm. The bushing being split, the bottom flange **116** thereof can extend through the upper central opening of the spray arm in a well-known manner.

To mount the spray arm **42** on the sleeve **84**, the arm is positioned therearound with the bottom of the arm being supported by the shoulder **85** of the sleeve. It will be understood that the valving mechanism to be hereinafter described is operatively disposed within the spray arm at the time of such mounting. The latch pin **76** is positioned within the sleeve so that the transverse pin **81** thereof contacts the bottom of the sleeve. The latch pin nut **100** is then threaded on the upper end of the latch pin, with the coil spring **110** firmly engaging the top of the washer **111**. Tightening of the nut **100** thus serves to bias the spray arm downwardly to firmly seat the same on the shoulder **85** of the sleeve **84**. As will be hereinafter explained, the pressure within the spray arm during rotation thereof will serve to raise slightly the bottom of the spray arm from the shoulder **85** of the sleeve **84** against the bias of the spring **110** thereby to reduce the frictional resistance to rotation of the spray arm.

Following mounting of the spray arm **42** on the sleeve **84**, the entire assembly is mounted on the center post **60**. To effect such mounting, the projection **78** of the latch pin **76** is aligned with the groove **79** formed in the center post. Subsequent to such alignment, the spray arm and sleeve assembly can be lowered until the bottom of the sleeve contacts the annular rim **83** of the center post. In such position the projection **78** of the latch pin is relatively adjacent the bottom of the groove **79** but remains partially above the recess **80** formed in the center post bottom opposite the groove **79**. To seat the projection **78** in the recess **80**, the latch pin **76** is depressed, through depression of the latch pin nut **100**, against the bias of the coil spring **110**, until the projection **78** clears the bottom of the center post, at which time the projection can be rotated 180° for alignment with the recess **80**. When the latch pin nut **100** is subsequently released, the spring **110** will firmly bias the latch pin upwardly thereby locking the projection **78** in the recess **80**, thereby releasably mounting the spray arm and sleeve on the center post. The recess **82** in the top of the center post is vertically dimensioned to accommodate the vertical movement of the transverse pin **81**.

To remove the spray arm and sleeve, the above described procedure is reversed, i.e., the nut **100** is depressed and the latch pin **76** rotated 180° until the projection is in registry with groove **79**, at which time the entire assembly can simply be lifted from the center post.

When the spray arm **42** and sleeve **84** are so mounted on the center post, the bias of the compressed coil spring **110** firmly seats the arm on the shoulder **85** of the sleeve **84**, and the bottom of such shoulder, in turn, firmly bears against the annular rim **83** of the center post. The biased seating of the spray arm **42** on the sleeve shoulder **85** is such as to substantially retard, in the absence of liquid pressure within the spray arm, rotation of the spray arm relative to the sleeve. However, when liquid is directed to the spray arm upwardly through the center post and sleeve for reactively rotating the same, the force of such pressurized liquid acting on the top of the spray arm housing tends to slightly lift the spray arm, against the bias of the spring **110**, such lifting reducing the frictional resistance to rotation of the arm by the sleeve shoulder **85**.

As long as the pressure is maintained within the spray arm, it will rotate relatively freely on the sleeve **84**. However, when the liquid pressure drops off, e.g. at the end of a wash or rinse cycle, the spring **110** will again firmly seat the spray arm on the sleeve. Since the liquid pressure within the spray arm drops off rather quickly at the cessation of liquid flow thereto, the seating of the spray arm on the sleeve under the bias of spring **110** effectively provides a braking action on the spray arm thereby bringing the same to a relatively quick stop following pressure cut off. This insures proper functioning of the valving mechanism for effecting reversal in direction of rotation of the spray arm at the beginning of the subsequent wash or rinse cycle, as will be hereinafter more specifically explained.

Referring to FIG. 5, there is illustrated therein the mounting for the upper spray arm **48**, with the latter being omitted for purposes of clarity. The arm **52** is formed with an annular groove **120** which provides a seat for receiving the bottom portion **122** of the spray arm sleeve **124**. The top surface of the mounting arm **52** is formed with an annular rim **126** similar to the rim **83** on the center post, the rim **126** being adapted to receive the annular shoulder **128** and the bottom portion **122** of the sleeve, in the manner previously described. The sleeve is formed with a central, cylindrical portion **130** for receiving the latch pin **132**, with the latter being provided with a transverse pin **134** and laterally extending projection **135** as above described for retaining the spray arm and sleeve in assembled position. The arm **52** is formed

with a groove 136 to receive projection 135 to permit mounting of the spray arm and sleeve on the arm 52. The arm 52 is further formed with a groove in the bottom thereof (not shown) extending normal to the groove 136 whereby the latch pin can be rotated 90° in either direction in the manner above described for releasably locking the entire assembly in place.

Referring now to FIGS. 2 and 3, the lower spray arm 42 comprises top and bottom mating housing sections 140 and 142, respectively, with each of such sections being provided with complemental tongue and groove contact surfaces commonly indicated at 144 for aligning the sections and enhancing tight assembly thereof. Each of the housing sections 140 and 142 is provided with longitudinally extending central ribs 146 and 148, respectively, which are similarly provided with complemental tongue and groove portions for aligning the same and collectively forming a longitudinal partition in the arm. The bottom housing section including the rib 148 is provided with longitudinally spaced openings for receiving threaded metallic inserts commonly designated at 150, with the mating housing section in the area opposite such inserts being formed with counterbored openings commonly designated at 152 for receiving mounting bolts 154, the bottom ends of which extend into threaded engagement with the inserts 150 thereby firmly to secure the sections together. As will be apparent, a suitable adhesive could be additionally employed to augment the securing of the sections.

The partition formed by the ribs 146 and 148 longitudinally divides the end of the spray arm into a pair of liquid-receiving chambers 156 and 158, respectively. It will be understood that the opposite end is similarly constructed to provide a pair of liquid-receiving chambers therein as well.

The top housing section 140 is provided with a plurality of rows of generally longitudinally aligned drive jets for rotating the spray arm in opposite directions. Thus, a series of radially spaced jets commonly designated at 160 are formed in the upper housing section relatively adjacent one side thereof and a second series of generally longitudinally aligned openings 162 are provided adjacent the opposite side for rotating the arm in the opposite direction. Each drive jet opening, referring to the opening 162 illustrated in FIG. 3, e.g., is counterbored to provide a beveled surface 163 inclined upwardly and outwardly for directing a portion of the liquid delivered to the opening in a directional path providing a horizontal component of force for reactively driving the arm in a well-known manner. A substantial portion of the liquid emanating from each drive jet opening will be directed vertically into the washing chamber. Thus, when liquid is directed through chamber 158, e.g. by valving mechanism to be hereinafter described, liquid emanating from the drive jets 162 will rotate the spray arm in a clockwise direction, referring to the FIG. 2 orientation thereof. Conversely, when liquid is directed through the chamber 156, the liquid emanating from the drive jets 160 will effect rotation of the spray arm in a counterclockwise direction, again referring to the FIG. 2 orientation thereof.

It will be noted that the drive jets 160 and 162 are radially staggered whereby the spray pattern in one direction of rotation is radially offset and angled from the spray pattern in the opposite direction of rotation, thereby providing improved washing results.

The opposite end of the spray arm is similarly formed with rows of generally longitudinally aligned drive jets relatively adjacent the sides of the arm. Thus, referring to FIG. 2, a series of jets 164 is formed in the top housing section 140 adjacent one side thereof and a second series of drive jets 166 is formed adjacent the opposite side thereof. In the same manner as previously described, the jets 164 and 166 are radially staggered to provide improved washing. A plurality of drive jets commonly designated at 168 are preferably provided in the generally central portion of the top housing section 140 to provide additional spray to the washing chamber immediately above such central area. Corner drive jets 169 and 170 are formed in the respective ends of the top housing section 140 to facilitate washing at the sides and corners of the washing chamber.

Referring to FIGS. 6 and 7, the chambers 156 and 158 previously described, and chambers 172 and 174 formed in the opposite end of the spray arm are adapted to communicate with the central portion of the spray arm through a series of valve-controlled openings. These openings are formed in angularly disposed partitions generally indicated at 176 and 178, with the partition 176, for example, being formed with diverging leg portions 180 and 182 formed with generally rectangularly shaped openings 184 and 186, respectively. The other partition 178 is similarly formed with diverging leg portions 188 and 190 in which are formed generally rectangular-shaped openings 192 and 194, respectively. The leg portions are preferably integrally formed with the upper and lower housing sections and comprise complemental mating sections as previously described. It will now be apparent that liquid directed to the chambers 158 and 172 will effect rotation of the spray arm in one direction, namely clockwise in the FIG. 6 orientation thereof, while liquid alternately directed to the chambers 156 and 174 will effect rotation of the spray arm in the opposite direction.

For alternately directing the liquid under pressure to the chambers 158, 172, and chambers 156, 174 during the various wash and rinse cycles for rotating the spray arm in opposite directions, valving mechanism generally indicated at 200 is provided. The valving mechanism 200 includes a rocker arm 202 having a central, annular mounting hub 204 adapted to be disposed around the cylindrical portion 88 of the spray arm sleeve 84. Pivot valve members 206 and 208 of identical construction are pivotally mounted on each end of the rocker arm 202, with the valve 206, referring to FIG. 8, comprising spaced legs 210 and 212 and a connecting portion 214, the latter being centrally bored for receiving the shank portion 216 of a shoulder rivet generally indicated at 218. The rivet includes an enlarged bottom shoulder portion 220 and a reduced upper end portion adapted to be swaged over the rocker arm as shown at 222 to maintain the pivot valve in assembled position. The pivot valves 206 and 208 are preferably formed of a plastic material and freely rotate on the respective shoulder rivets.

As best shown in FIG. 6, the legs 210 and 212 of the pivot valve 206, e.g., are adapted alternately to contact the leg portions 190 and 188, respectively, of the partition 178, and close the respective openings 194 and 192 formed in the partition legs whereby liquid can alternately be directed into the chambers 174 and 172. Thus, in the solid-line, FIG. 6 position of the pivot valve 206, the opening 194 is closed by the leg 210 whereby fluid directed to the interior of the spray arm enters the chamber 172 and is directed outwardly of the spray arm through the drive jets 164. When the rocker arm 202 is caused to rotate by means to be presently described, the leg 212 will be moved to a position adjacent the partition leg 188 and overlying the opening 192 whereby liquid subsequently directed to the spray arm will enter chamber 174.

The rocker arm 202 has downwardly struck therefrom a loop 224 which is adapted to receive the upper end 228 of a clutch spring 230 for operatively connecting the latter to the rocker arm. The bottom end 232 of the clutch spring is downwardly offset and is adapted to be disposed in an opening 234 formed in a clutch plate generally indicated at 236 for operatively connecting the clutch spring to the clutch plate. The latter is formed with a central hub portion 238 which telescopes over the cylindrical central portion 88 of the sleeve 84. The hub portion 238 is connected to an outer annular ring 240 through a plurality of spider arms commonly designated at 242. The outer

ring **240** is beveled on the outside face thereof at an angle to provide a complemental mating surface for the above described beveled surface **94** of the sleeve **84**. The valving mechanism is shown assembled in FIG. 4, and in such assembled position the clutch spring **230** is in compression whereby the clutch plate **236** is firmly seated on the beveled surface **94** of the sleeve **84**. The rocker arm **202** is spaced from the top housing section of the spray arm by the bottom flange **116** of the bushing **112**.

Referring now to the manner in which the valving mechanism **200** functions to automatically alternately direct liquid to the sets of chambers **158, 172**, and **156, 174**, in the FIG. 6 solid-line position of the rocker arm **202** and the pivot valves **206** and **208**, liquid entering the lower spray arm **42** through the center hose **40** and upwardly through the center post **60** and spray arm sleeve **84** forces the pivot valves **206** and **208** tightly against the partition legs **180** and **190**, respectively, closing the openings **184** and **194**. The liquid entering the spray arm will thus be directed into the chambers **172** and **158** and outwardly of the spray arm through drive jets **162** and **164** whereby the spray arm **42** will be rotated in a clockwise direction as above described. The liquid pressure within the spray arm will lift slightly the spray arm from the shoulder **85** of the spray arm sleeve **84** against the bias of spring **110** thereby substantially decreasing the frictional drag on the arm during rotation thereof. As the spray arm begins rotation, the rocker arm **202** will rotate therewith by virtue of such liquid pressure acting against the pivot valves. During the initial stages of such rotation, the clutch spring **230**, being compressively loaded, will maintain the clutch plate in tight frictional contact with the beveled surface **94** of the sleeve **84**, and thus, owing to the fact that the upper end **228** of the clutch spring is operatively coupled to the rocker arm, the upper convolutions of the clutch spring **230** will rotate relative to the bottom convolutions thereof, whereby torque will build up in the spring which will tend to bias the rocker arm away from its FIG. 6, solid-line position. Since, however, the force of the liquid pressure acting on the respective pivot valves **206** and **208** is in excess of the force of the compressive loading of the clutch spring **230**, the torque build-up in the spring will be relieved at a certain period of rotation whereat the clutch plate **236** will be carried by the clutch spring and will rotate relative to the beveled surface **94** of the spray arm sleeve **84**.

When the liquid pressure within the spray arm **42** drops, for example at the end of one of the several cycles during the washing operation, the above-described torque build-up in the clutch spring **230** will effect rotation of the rocker arm **202** from its solid-line, FIG. 6 position to its dotted-line, FIG. 6 position. Such rotation will carry the pivot valves **206** and **208** to their dotted-line, FIG. 6 positions overlying the openings **192** and **186** in the partition legs **188** and **182**, respectively. The clutch plate **236** will again firmly contact the beveled surface **94** of the sleeve **84** under the bias of the clutch spring whereby the valving mechanism is ready for the next operating cycle. With the drop in liquid pressure, the coil spring **110** will bias the spray arm downwardly to a firm seating on the shoulder **85** of the spray arm sleeve. The resultant increase in frictional resistance to rotation provides a braking action on the spray arm, serving quickly to stop the same following the pressure drop, thereby insuring reversal when liquid is again pumped to the spray arm.

At the beginning of the next cycle, the liquid entering the spray arm is directed through the now exposed partition openings **184** and **194**, thereby effecting rotation of the spray arm in the opposite or counterclockwise direction. The dishes and tableware are thus exposed to liquid spray from the opposite direction, and, moreover, they are exposed to a different spray pattern as a result of the radial staggering of the drive jets as above described. Relative rotation between the upper and lower convolutions of the clutch spring during the initial rotation of the spray arm will result in a torque build-up in the spring as above explained which will, when the liquid pressure within the spray arm drops at the end of the cycle, automatically effect rotation of the rocker arm to move the pivot valves **206** and **208** back to a position overlying the openings **184** and **194**.

As above indicated, the structure and operation of the upper spray arm **48** is identical to that of the lower spray arm **42**, and thus need not be separately described. The upper spray arm will thus similarly automatically reverse at the end of each cycle in response to a drop in pressure within the spray arm housing.

In this manner it will be seen that at the end of each cycle during the washing operation the valving mechanism described will automatically position the pivot valve members to insure a reversal in direction of rotation of the spray arm at the beginning of the subsequent cycle. In a normal washing operation there may be and generally are several wash and several rinse cycles whereby the spray arm is frequently reversed thereby to produce improved washing. Such improved washing is additionally enhanced by the fact that the drive jets are radially staggered whereby different radial spray patterns are achieved for each direction of rotation.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A reversing spray arm assembly comprising a rotatably mounted reaction spray arm, means for supplying liquid under pressure to said spray arm, said spray arm being provided with first drive jet means for rotating said spray arm in one direction and second drive jet means for driving said spray arm in the opposite direction, first chamber means communicating with said first drive jet means for supplying liquid under pressure thereto and second chamber means communicating with said second drive jet means for supplying liquid under pressure thereto, valving mechanism responsive to fluctuations in liquid pressure within said spray arm for reversing the direction of rotation thereof, said valving mechanism comprising rocker means disposed within said spray arm and valve means pivotally carried by said rocker means for alternately directing the liquid to said first and second chamber means for respectively rotating said spray arm first in said one direction and then in said other direction.

2. A reversing spray arm assembly comprising a rotatably mounted reaction spray arm, means for supplying liquid under pressure to said spray arm, partition means within said spray arm defining first and second chamber means for alternately receiving the liquid under pressure, said spray arm being provided with first drive jet means communicating with said first chamber means for rotating said spray arm in one direction and second drive jet means communicating with said second chamber means for rotating said spray arm in the opposite direction, valving mechanism responsive to fluctuation in the liquid pressure within said spray arm for reversing the direction of rotation thereof, said valving mechanism comprising a rocker arm rotatably mounted in said spray arm and pivot valve means pivotally carried by said rocker arm for alternately directing liquid to said first and second chamber means for respectively rotating said spray arm first in said one direction and then in said opposite direction.

3. The combination of claim **2** wherein said partition means is provided with a pair of openings through each of which liquid under pressure alternately can enter said first and second chamber means, said pivot valve means alternately closing first one opening and then the other in response to movement of said rocker arm.

4. The combination of claim 3 wherein said pivot valve means is pivotally mounted on said rocker arm adjacent an end thereof and comprises parallel sides, each such side being adapted to contact said partition means to cover the respectively adjacent opening of the same, while the other side is spaced away from the other partition opening to permit the liquid to pass therethrough into the associated chamber means.

5. The combination of claim 2 wherein said rocker arm is maintained in a first position of adjustment by the liquid pressure within said spray arm, and means biasing said rocker arm away from such first position of adjustment but being ineffective to move said rocker arm until the force of the liquid pressure in the spray arm falls below the force of said biasing means at which time said rocker arm is moved by said biasing means to a second position of adjustment.

6. The combination of claim 5 wherein said biasing means comprises a spring compressively loaded when assembled, said spring being connected at one end to said rocker arm for rotation therewith and being connected at its lower end to clutch plate means which remains stationary during initial rotation of said spray arm by virtue of the compressive loading of said spring, the relative rotation between the upper and lower ends of said spring during initial rotation of said spray arm producing a torque buildup in said spring effective when the liquid pressure in said spray arm drops to move said rocker arm to said second position of adjustment.

7. A reversing spray arm assembly comprising a rotatably mounted hollow reaction spray arm mounted centrally for rotation in both directions, means for supplying liquid under pressure to said spray arm, means dividing said spray arm interiorly into a plurality of longitudinally extending chambers in both ends of said spray arm, partition means further dividing said chambers into first and second chambers on one side of the longitudinal center of said spray arm and third and fourth chambers on the other side of the longitudinal center of said spray arm, said spray arm being provided with first drive jet means communicating with said first and third chambers for rotating said spray arm in one direction and second drive jet means communicating with said second and fourth chambers for driving said spray arm in the opposite direction, valving mechanism comprising arm means movably mounted in said spray arm and valve members pivotally carried by said arm means for alternately directing liquid to said first and third chambers and to said second and fourth chambers for respectively rotating said spray arm first in said one direction and then in said opposite direction.

8. A reversing spray arm assembly comprising a rotatably mounted reaction spray arm, means for supplying liquid under pressure to said spray arm, said spray arm being provided with first drive jet means for rotating said spray arm in one direction and second drive jet means for driving said spray arm in the opposite direction, first chamber means communicating with said first drive jet means for supplying liquid under pressure thereto and second chamber means communicating with said second drive jet means for supplying liquid under pressure thereto, valving mechanism responsive to a drop in liquid pressure within said spray arm for reversing the direction of rotation thereof, said valving mechanism comprising

rocker means disposed within said spray arm and valve means pivotally mounted on said rocker means for alternately directing the liquid to said first and second chamber means for respectively rotating said spray arm first in said one direction and then in said other direction, and brake means for relatively quickly stopping rotation of said spray arm responsive to such a pressure drop thereby conditioning the same for subsequent rotation in the opposite direction.

9. The combination of claim 8 further including a stationary spray arm sleeve having a shoulder portion for supporting said spray arm, said brake means comprising spring means normally urging said spray arm into firm seating on said shoulder for frictionally retarding rotation of said arm, the pressure of the liquid supplied to said spray arm slightly lifting the same from the shoulder against the bias of said spring means thereby substantially reducing the frictional resistance of said shoulder to rotation of said spray arm, said spring means again biasing the spray arm into firm seating on said shoulder when the liquid pressure drops within said spray arm.

10. A reversing spray arm assembly comprising a rotatably mounted hollow reaction spray arm mounted centrally for rotation in both directions, means for supplying liquid under pressure to said spray arm, means dividing said spray arm interiorly into a plurality of longitudinally extending chambers in both ends of said spray arm, partition means further dividing said chambers into first and second chambers on one side of the longitudinal center of said spray arm and third and fourth chambers on the other side of the longitudinal center of said spray arm, said spray arm being provided with first drive jet means communicating with said first and third chambers for rotating said spray arm in one direction and second drive jet means communicating with said second and fourth chambers for driving said spray arm in the opposite direction, valving mechanism comprising a relatively elongated rocker arm, pivot valve members pivotally carried by said rocker arm at each end thereof, each of said pivot valve members being formed with parallel, chamber-closing sides, with each such side alternatively contacting and closing the entry to the adjacent chamber and permitting liquid to enter the other adjacent chamber, and means for biasing said rocker arm away from such chamber-closing position of said pivot valve members, such biasing means being ineffective to move said rocker arm until the force of the liquid pressure in the spray arm falls below the force of said biasing means at which time said rocker arm is moved by said biasing means to carry said pivot valve members to a position closing the other said adjacent chambers to the flow of liquid.

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