Oct. 13, 1953 H. F. LYMAN 2,655,164

DISHWASHING APPARATUS

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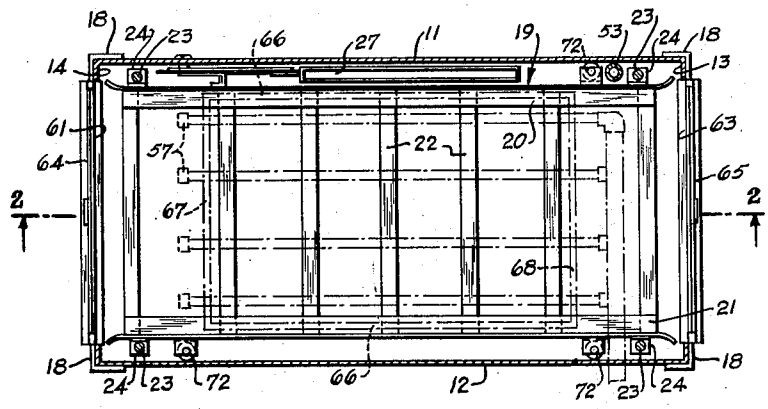


FIG. 1

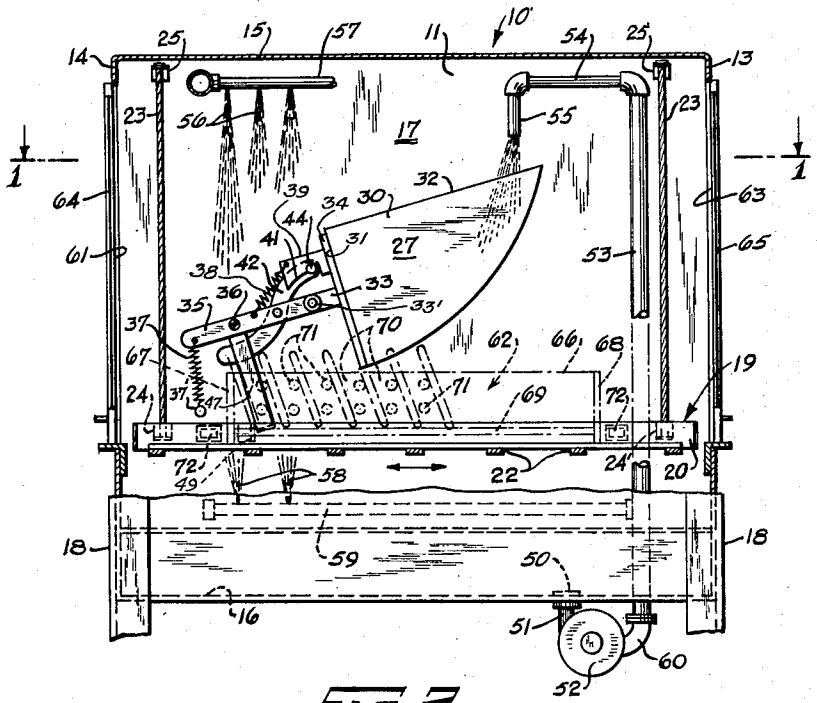


FIG. 2

INVENTOR
HOMER F. LYMAN
BY
E. Francis Wentworth Jr
ATTORNEY

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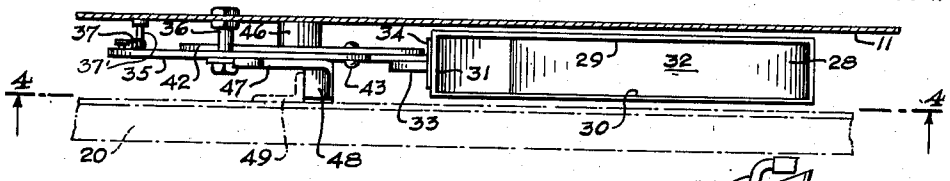


FIG. 3

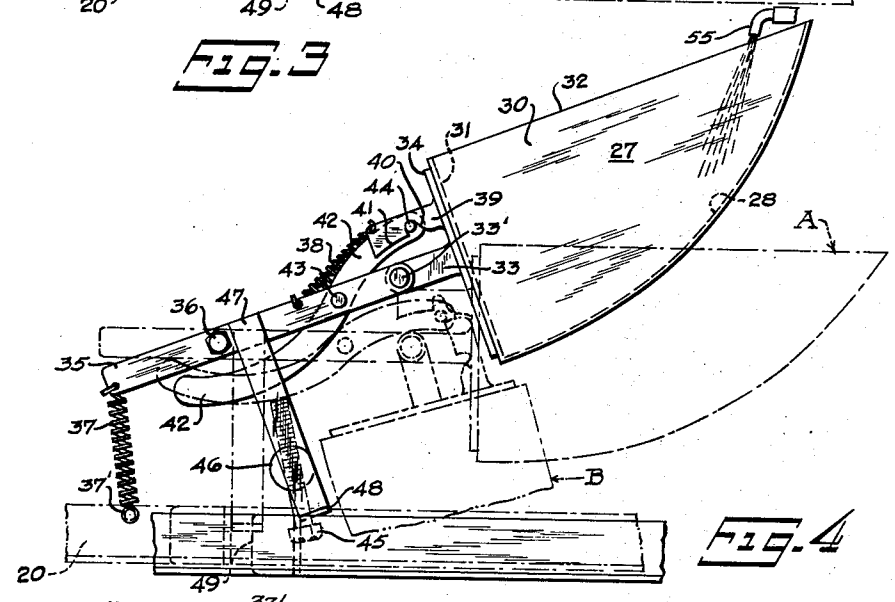


FIG. 4

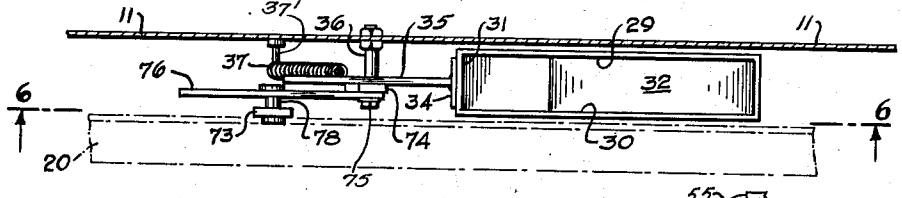


FIG. 5

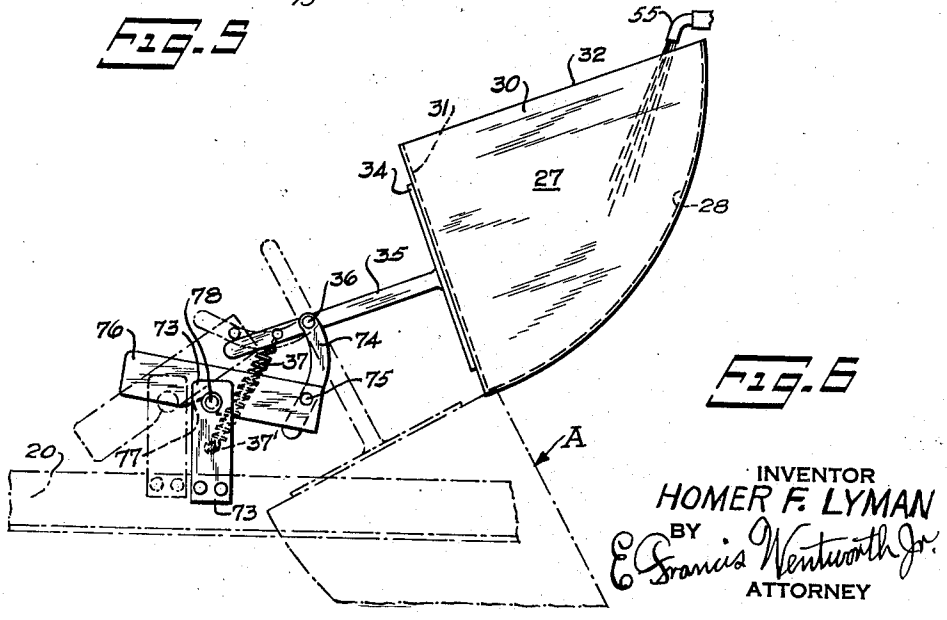


FIG. 6

INVENTOR
HOMER F. LYMAN
BY E. Francis Wentworth Jr.
ATTORNEY

Oct. 13, 1953 H. F. LYMAN 2,655,164

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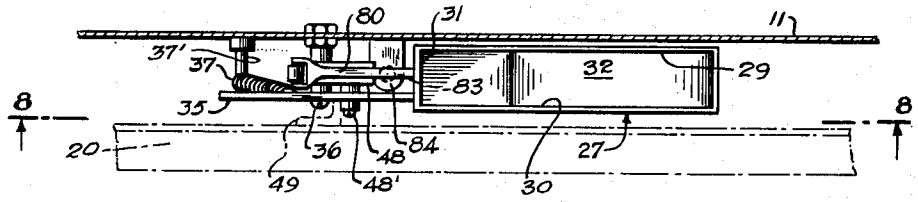


FIG. 7

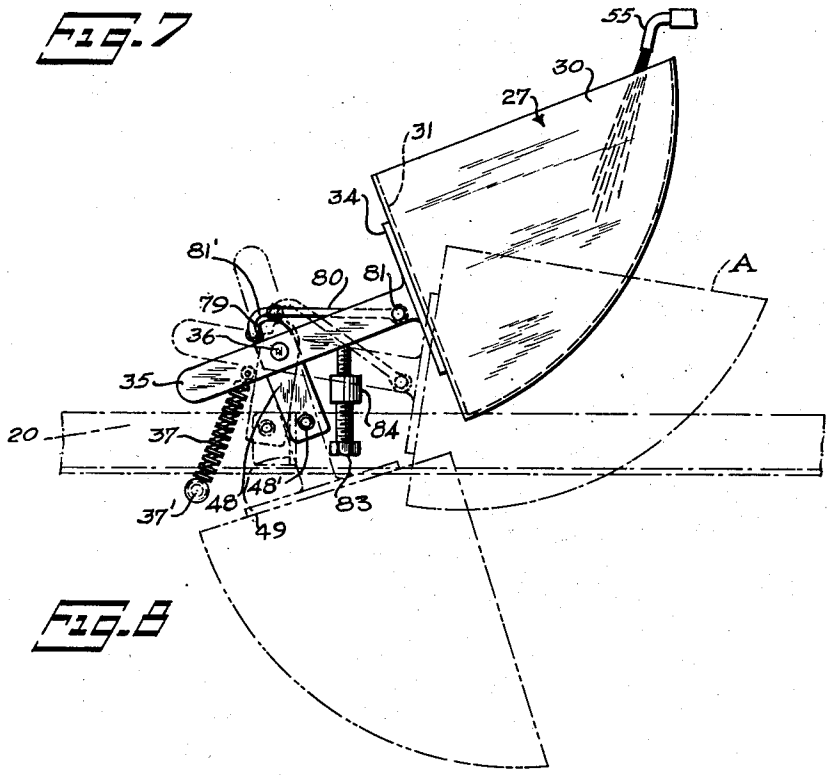


FIG. 8

INVENTOR
HOMER F. LYMAN
BY
E. Francis Wentworth Jr.
ATTORNEY

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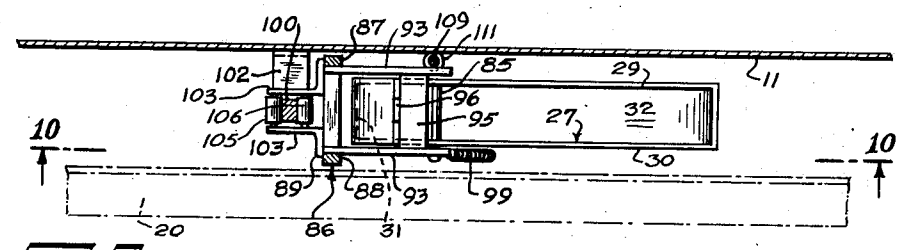


Fig. 9

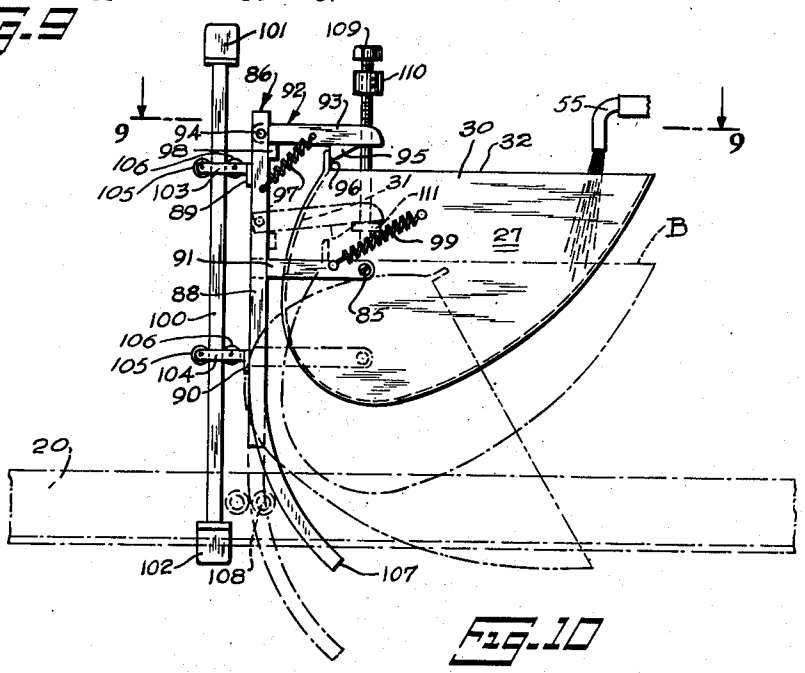


Fig. 10

INVENTOR
HOMER F. LYMAN
BY
E. Francis Wentworth Jr.
ATTORNEY

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DISHWASHING APPARATUS

Homer F. Lyman, Nutley, N. J.

Application June 4, 1949, Serial No. 97,180

11 Claims. (Cl. 134—141)

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This invention relates to dishwashing machines in which dishes are washed by spraying washing fluid under pressure thereon and more particularly relates to actuating mechanism for said machines.

The present invention provides actuating mechanism for a dishwashing machine in which a plurality of streams of washing fluid is sprayed onto dishes contained in a rack which rack is supported on a reciprocal table. The table is mounted for reciprocal movement transversely of the streams of washing fluid, said reciprocal movement being imparted by the actuating mechanism of the present invention. The actuating mechanism is operated by a portion of the washing fluid. As the table and the rack of dishes thereon is reciprocated, each stream of washing fluid is directed over a plurality of dishes in the rack, the dishes being washed thereby, not only by washing fluid passed over them in the direction of flow of said streams of fluid but also by movement of the dishes transversely of the streams.

The invention will be understood from the following description when considered in connection with the accompanying drawing forming a part thereof and in which:

Fig. 1 is a horizontal sectional view of a dishwashing machine embodying the present invention and taken on the line 1—1 of Fig. 2;

Fig. 2 is a longitudinal vertical sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a plan view of actuating mechanism shown in Figs. 1 and 2 but on an enlarged scale;

Fig. 4 is a side elevational view of the actuating mechanism taken on the line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3 but of another embodiment of the invention;

Fig. 6 is a view similar to Fig. 4 but taken on the line 6—6 of Fig. 5;

Fig. 7 is a view similar to Fig. 3 but of a further embodiment of the invention;

Fig. 8 is a view similar to Fig. 4 but taken on the line 8—8 of Fig. 7;

Fig. 9 is a view similar to Fig. 3 but of a still further embodiment of the invention, and

Fig. 10 is a view similar to Fig. 4 but taken on the line 10—10 of Fig. 9.

Like characters of reference refer to like parts throughout the several views.

Referring to the drawings, particularly Figs. 1 and 2 thereof, the reference numeral 10 designates the casing of a dishwashing machine having opposite side walls 11 and 12, opposite end walls 13 and 14, a top 15 and bottom 16. The

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opposite side walls, opposite end walls, top and bottom form a washing chamber 17. Legs 18, which support the casing 10, are secured to the four corners thereof.

A dish rack supporting table 19 is disposed intermediate the top and bottom of washing chamber 17 and mounted for reciprocal movement longitudinally of the chamber. Table 19 comprises L-shaped track members 20 and 21 extending longitudinally of chamber 17 in a horizontal plane and in laterally spaced relationship to one another. Track members 20 and 21 are maintained in spaced relationship to one another by a plurality of spaced cross-stays 22 which are secured adjacent the opposite ends thereof to said track members respectively. The width and also the length of table 19 is less than the width and length of chamber 17 so that said table may be reciprocated within said chamber as will hereinafter be fully described. As shown in Figs. 1 and 2, table 19 is positioned in chamber 17 so that the opposite sides thereof are in spaced relationship respectively with the opposite side walls 11 and 12 of said chamber and the opposite ends of the table are in spaced relationship with opposite end walls 13 and 14 respectively. Table 19 is supported adjacent its four corners by cables 23 which are fastened at the bottom thereof to L-shaped brackets 24 secured to track members 20 and 21 respectively and at the top fastened to brackets 25. The brackets 25 are secured to side walls 11 and 12 respectively of casing 10 adjacent top 15. It will readily be understood that chains, rods, levers or the like may be used to support table 19 in place of cables 23 if so desired. If rods or levers are used, they would be pivotally mounted at one end thereof on the four corners respectively of table 19 and, at the opposite end, pivotally mounted on side walls 11 and 12 respectively adjacent the top thereof. Table 19, when at rest, extends in a horizontal plane and the cables 23 extend perpendicularly to the table. Guide rollers 72 are mounted on track members 20 and 21 adjacent the four corners of table 19 with rollers 72 engaging the inner surface of side walls 11 and 12 so as to guide reciprocal movement of the table and prevent lateral movement of said table.

Actuating means for imparting reciprocal movement to table 19 in a horizontal plane within chamber 17 is provided. As shown in Figs. 1 to 4, the actuating means comprises a water container or bucket 27 of substantially right-triangular shape except that the bottom 28 of the container, the hypotenuse, is arcuate. The

container comprises spaced side plates 29 and 30, an end plate 31 and bottom plate 28 arranged to form a fluid-tight chamber 32. The container 27 is open at the top 32 thereof.

Bucket 27 has a supporting arm 33 secured to a mounting member 34 fastened to end plate 31, the supporting arm projecting outwardly from the end plate at substantially right angles. Arm 33 is pivotally connected at 33' to one end of a lever 35 which lever is pivotally mounted intermediate the opposite ends thereof on a pivot pin 36 which pivot pin is secured in the side walls 11 of casing 10. Bucket 27, as shown in full lines in Fig. 4, is normally maintained in an inclined position by means of a coil spring 37. Spring 37 is connected at one end thereof to the end of lever 35 opposite the end to which arm 33 is connected and at the opposite end to wall 11 by means of pin 37'. A latch 39 projects outwardly from and is secured to mounting 34 on end 31 of the bucket. Latch 39 has a detent 40 in the lower edge thereof which lower edge has a curved cam surface 41.

A latch operating lever 42 which, as shown, is reversely curved and is pivotally mounted intermediate the reversely curved portions on a pivot pin 43 attached to lever 35 intermediate pivot pin 36 and pivot 33'. A latch pin 44 projects from lever 42 into detent 40. Detent 40 is normally held in engagement with pin 44 by tension of spring 38 so that pin 44 acting on latch 39 through detent 40 normally maintains said latch and lever in the position shown in full lines in Fig. 4. An adjusting screw 45 is adjustable in a boss 46 and is positioned in the path of clockwise movement of lever 42 so that the lowermost edge of lever 42 will engage the screw. Actuating bar 47, as shown, is secured to and projects downwardly from lever 35 at right angles to the longitudinal axis of the lever. Bar 47 has a flange 48 turned inwardly toward L-shaped member 20 of table 19 so as to engage a stop 49 secured to said L-shaped member.

Bucket 27 is moved downwardly in a clockwise direction, as will hereinafter be fully described, by flowing liquid thereinto. As shown in Fig. 2, washing fluid withdrawn from the bottom of chamber 17 through inlet 50 connected to suction 51 of pump 52 which discharges said liquid into conduit 53. Liquid from conduit 53 flows into horizontally extending discharge pipe 54 which has an outlet nozzle 55 arranged to discharge a jet of liquid under pressure downwardly into chamber 32 of bucket 27.

Streams of washing fluid 56 (Fig. 2) are directed downwardly toward and over table 19 from spray pipes 57 adjacent the top of chamber 17 while streams of washing fluid 58 are directed upwardly and over table 19 from lower spray pipes 59. Spray pipes 57 and 59, as shown in Fig. 2, receive washing fluid from conduit 53 which is connected to the discharge 60 of pump 52. If so desired, separate pumps may be used to supply washing fluid under pressure to spray pipes 57 and 59 and to discharge pipe 53. A separate pump receiving liquid from a source other than chamber 17 and discharging said liquid into bucket 27 through discharge pipe 53 and nozzle 55 could also be used if so desired.

Casing 10 has an inlet opening 61 in end wall 14 thereof through which a tray 62 of dishes may be placed on track members 20 and 21 of table 19 in chamber 17. An outlet opening 63 is in end wall 13 through which outlet opening a tray of dishes may be removed from chamber 17 after the dishes are washed. The inlet and outlet openings are closed by sliding doors 64 and 65 respectively.

Dish tray 62 comprises spaced, opposite, longitudinally extending side members 66 and opposite end members 67 and 68 extending between the side members at the opposite ends of the tray. The sides 66 of the tray are so spaced apart that they rest upon the track members 20 and 21 respectively. A plurality of laterally spaced rods 69 extend longitudinally of the rack adjacent the bottom thereof between the ends of the tray. Spaces 70 for receiving dishes are formed by spaced rows of rods 71 extending transversely of the rack between sides 66 thereof.

In operation, the dish tray or rack 62 is passed through opening 61 in end wall 14 of casing 10 and positioned on table 19 where the tray is maintained without movement in relationship to the table during the dishwashing operation due to the weight of the tray of dishes. Stops to prevent movement of the tray in relationship to the table may be provided if desired. Door 64 covering opening 61 is closed and washing fluid is pumped by pump 52 through inlet 50 into discharge pipe 53 and into spray pipes 57 and 59. Streams of washing fluid under pressure are directed downwardly from spray pipes 57 and upwardly from spray pipes 59 over the dishes in tray or rack 62 while fluid under pressure is directed by nozzle 55, into bucket 27.

As bucket 27 fills with liquid, a predetermined weight is reached at which weight the force exerted on lever 35 by spring 37 is overcome thereby permitting the bucket to move downwardly in a clockwise direction to position A, Fig. 4. During such movement, the tension of spring 38 maintains latch pin 44 and detent 40 of latch 39 in engagement preventing movement of bucket 27 on pivot pin 33'. Clockwise movement of bucket 27 will thereby cause lever 35 to pivot in a downward or clockwise direction on pivot pin 36 against the tension of coil spring 37. Downward movement of lever 35 also moves actuating bar 47, the flange 48 of which engages stop 49 on angle 20 of table 19, in a clockwise direction thereby causing table 19 with the tray 62 of dishes thereon to be moved to the left of Fig. 1 to 4. Movement to the left, as above described, will be guided by rollers 72 attached to L-shaped members 20 and 21 of table 19 which rollers bear against side walls 11 and 12 of casing 10. Since the table is suspended on cables 23 such movement will cause said table to rise slightly.

The extent of the movement of table 19 is reached when bucket 27, lever 35 and actuating bar 47 are in position A shown in dot and dash lines Fig. 4. Immediately preceeding such position, latch operating lever 42 engages the upper end of adjusting screw 45. As lever 35 continues its movement to position A, the engagement of adjusting screw 45 with lever 42 turns the latch lever in a clockwise direction on pivot 43 causing latch pin 44 to turn latch 39 and bucket 27 in a clockwise direction on pivot 33, said movement of the bucket and latch disengaging detent 40 from pin 44 leaving bucket 27 free to pivot on pivot pin 33'. When the bucket, filled with liquid, is free to pivot on pin 33' it drops to the position indicated at B Fig. 4 spilling the liquid from the bucket.

The spring 38 maintains the cam surface 41 of latch 39 in contact with pin 44, the tension of said spring and the force exerted by the tendency

of table 19 and tray 62, due to their weight, to return to their normal position, as shown in Fig. 1, being such that when bucket 27 is empty and thereby released of the weight of the liquid, it is returned to position A causing latch pin 44 to enter detent 40 in latch 44. Tension of spring 37 now acts on lever 35 to turn said lever in a counterclockwise direction on pivot 36 while the force exerted by the weight of the table and dish tray bears on actuating bar 47 through stop 49 to also move said bar 47 and lever 35 in a counterclockwise direction. By this action, bucket 27 is lifted in a counterclockwise direction upwardly to the position shown in full lines in Fig. 4 and in Fig. 2, in which position it is refilled with liquid and the operation hereinabove described is repeated.

The bucket 27, in the above-set forth operation, is rapidly filled and rapidly emptied which filling and emptying is continuously repeated causing rapid reciprocation of table 19 with tray 62 of dishes thereon. Reciprocation of the tray of dishes in respect to sprays 56 and 57 of washing fluid causes the dishes to be washed, not only by washing fluid passed over them in the direction of flow of said streams of fluid, but also by movement of the dishes transversely of the streams.

In the embodiment of the invention illustrated in Figs. 5 and 6, lever 35 is secured to mounting member 34 on end plate 31 of bucket 27 which lever, as in the embodiment of the invention shown in Figs. 1 to 4, is pivoted on pivot pin 36. Spring 37 maintains bucket 27 in an upright inclined position, as shown in full lines, Fig. 6, when said bucket is empty. One end of the spring is fastened to lever 35 at the side of pivot pin 36 opposite that on which the bucket is secured, the opposite end of the spring being secured to pin 37' in side wall 11 of casing 10. Also mounted at one end thereof on pivot pin 36 so as to turn on said pin is a curved arm 74 which is fastened to lever 35 so as to be moved by movement of lever 35. Arm 74 extends downwardly from pivot 36 and is pivotally secured by bolt 75 to one end of an actuated link 76. The link 76 has a detent 77 therein intermediate the opposite ends of said arm which detent pivotally engages an actuating pin 78 positioned in an actuated arm 73 mounted on and projecting upwardly from the perpendicular leg of L-shaped member 20 of table 19. Link 76 is thereby pivotally mounted on arm 73.

In operation of the embodiment of the invention illustrated in Figs. 5 and 6, when the weight of the liquid flowing into bucket 27 from nozzle 55 is sufficient to overcome the force exerted on lever 35 by spring 37, the bucket moves in a clockwise direction against the tension of the spring. Clockwise movement of the bucket also causes curved arm 74 to turn on pivot 36 in a clockwise direction thereby moving actuating link 76 to the left, Fig. 6, and in a counterclockwise direction on actuating pin 78. This also moves actuated arm 73, and table 19, to which said arm is secured, to the left. The extent of said movement is reached when bucket 27 obtains position A, Fig. 6, the various parts of the actuating mechanism assuming said position as shown in dot and dash lines. In position A, the bucket is quickly emptied of liquid and thereby relieved of the weight thereof whereupon the tension of spring 37, no longer overcome by the weight of liquid in bucket 27 and the weight of table 19 and tray 62 of dishes (which table and tray have been raised slightly upwardly from their normal position by movement to the left, Fig. 6, as hereinbefore described in the operation of the embodiment of the invention shown in Figs. 1 to 4) acts upon lever 35 to move said lever in a counterclockwise direction. The spring acts directly on lever 35 while the force exerted by the weight of the table and dish tray acts on said lever through actuated arm 73 which arm is moved to the right, Fig. 6, thereby moving actuating link 76 to the right and arm 74 in a counterclockwise direction. Bucket 27 is in this manner returned to the position shown in full lines in Fig. 6 and is in readiness to be refilled. As in the embodiment of the invention illustrated in Figs. 1 to 4, bucket 27 is rapidly filled and rapidly emptied which filling and emptying is continuously repeated causing rapid reciprocation of table 19 with tray 62 of dishes thereon.

In the embodiment of the invention illustrated in Figs. 7 and 8, lever 35 is secured to mounting member 34 on end plate 31 of bucket 27 and is pivoted on pivot pin 36 as in Figs. 5 and 6. Spring 37, secured at one end to lever 35 at the left of pivot 36 and at the opposite end to pin 37' mounted on side wall 11, acts upon lever 35 to maintain bucket 27, when empty, in an inclined upright position, as shown in full lines in Fig. 8. As in the form of the invention shown in Figs. 1 to 4, an actuating bar 48 extends downwardly in its normal position, as shown in full lines, Fig. 8, at right angles to the longitudinal axis of lever 35. Bar 48, however, in this form of the invention, is pivotally mounted on pivot 36 independently of lever 35. A pin 48' projects from bar 48 and engages stop 49 on L-shaped member 20 of tray 19 which maintains the bar in said normal position so long as table 19 rests in a horizontal plane and cables 23 on which the table is suspended are each at rest in a vertical plane. The upper end of bar 48 projects above pivot 36 and has a locking detent 79 therein. An actuating rod 80 is pivotally mounted at one end thereof on lever 35 adjacent bucket 27 by a pivot screw 81. The opposite end of rod 80 is substantially hook-shaped at 81' and has a roller 82 which engages detent 79. An adjusting screw 83 is adjustably mounted in a boss 84 which boss is positioned on side wall 11, the boss being so disposed that the adjusting screw is in vertical alignment with rod 80.

In operation of the form of the invention shown in Figs. 7 and 8, when the weight of the liquid flowing into bucket 27 from nozzle 55 is sufficient to overcome the force exerted on lever 35 by spring 37, the bucket moves in a clockwise direction. Movement of the bucket and lever 35 to which it is attached in a clockwise direction, causes the hooked end 81' of rod 80 to exert a clockwise force on the detent 79 turning said bar in a clockwise direction on pivot 36. Clockwise movement of bar 27 moves table 19 with the tray 62 of dishes thereon to the left, Fig. 8, because of the engagement of pin 48' with stop 49. When the bucket reaches position A, Fig. 8, in its clockwise movement, rod 80 is engaged by adjusting screw 83 whereupon further clockwise movement of the bucket causes rod 80 to be pivoted in a clockwise direction on pivot screw 81 disengaging hooked end 81' of the rod from detent 79. Disengagement of roller 82 on hooked end 81' of rod 80 from detent 79 permits the weight of the table 19 with the tray 62 of dishes thereon to return said table and tray to their normal position, as hereinbefore described in the operation of the apparatus illustrated in Figs. 1 to 6, because bar

47 is free to be turned in a counterclockwise direction on pivot 36 by the force exerted on pin 48' by stop 49. Bar 47 is thereby returned to the position illustrated in full lines in Fig. 8.

After release of end 81' from detent 79, the bucket 27 and lever 35 continues to move in clockwise direction against the tension of spring 37 and spills the liquid from the bucket. When the bucket is relieved of the weight of the liquid therein, the tension of spring 37 is no longer overcome by the weight of the bucket plus the liquid and the tension acts to turn lever 35 in a counterclockwise direction on pivot 36 until the bucket and the lever are returned to the position shown in full lines in Fig. 8. In this latter position, hooked end 81' of rod 80 again engages detent 79 and bucket 27 is in readiness for refilling. As in the embodiments of the invention illustrated in Figs. 1 to 6, bucket 27 is rapidly filled and rapidly emptied which filling and emptying is continuously repeated causing rapid reciprocation of the table 19 with tray 62 of dishes thereon.

In the embodiment of the invention illustrated in Figs. 9 and 10, bucket 27 is pivotally mounted on a pivot pin 85 which pivot pin has vertical movement with a rack 86. Rack 86 comprises spaced, parallel uprights 87 and 88 which are held in spaced relationship to one another by spacing bars 89 and 90. Horizontally extending arms 91 are respectively attached to uprights 87 and 88 intermediate the opposite ends of said uprights and are spaced apart a distance slightly greater than the width of bucket 27. Pivot pin 85 is mounted at the opposite ends thereof for pivotal movement in arms 91 and extends transversely of bucket 27 and is fastened thereto to turn with the bucket. The pin 85 is so disposed in relationship to the bucket that the bucket normally tends to move and turn the pin in a clockwise direction. End plate 31 is curved inwardly toward rack 86 instead of extending at right angles to top 32 of said bucket as in the other embodiment of the invention disclosed herein. Normally movement of the bucket in a clockwise direction is prevented by a latch 92 comprising arms 93 pivoted respectively in uprights 87 and 88 on pivot pin 94. A latch member 95 extends between arms 93 and projects downwardly to engage upwardly extending lip 96 on end plate 31 of the bucket. Latch member 95 is normally held in engagement with lip 96 by tension of spring 97, stop bar 98 limiting the downward or clockwise movement of arms 93. The bucket is thusly maintained in its normal position, the position shown in full lines in Fig. 10. A spring 99 is attached at one end to bucket 27 and at the opposite end to an arm 91 so as to normally exert a counterclockwise force on the bucket.

Rack 86 is mounted on a vertical rod 100 and so as to have vertically reciprocal movement in respect thereto. Rod 100 is positioned in a fixed position on wall 11 by an upper bracket 101 and a lower bracket 102. So that rack 86 may move freely in respect to rod 100, clevises 103 and 104 extend outwardly from spacing bars 89 and 90 respectively which clevises have rollers 105 and 106 on opposite sides of rod 100 so as to rotatably engage the rod.

Upright 87 has a curved portion 107 at the lower end thereof which portion is curved away from rod 100 and bears against a pin 108 on the upright leg of L-shaped member 20 of table 19. The weight of table 19 with the tray 62 of dishes thereon is such in relationship to the weight of bucket 27, when empty, and rack 86, that rack 86 and said bucket are normally maintained in the position illustrated in full lines in Fig. 10 by engagement of pin 108 with curved portion 107.

An adjusting screw 109 adjustable in a boss 110 secured to wall 11 has a trip member 111 thereon in the path of the downward movement of an arm 93 of latch 92 which trip may be raised or lowered by turning screw 109.

In operation of the embodiment of the invention shown in Figs. 9 and 10, as the bucket 27 is filled with liquid the force exerted by the weight thereof becoms greater than the force exerted by the pin 108 on curved portion 107 of upright 87 which permits the bucket 27 and rack 86 to move downwardly causing pin 108 and table 19 to move to the left, Fig. 10. In the downward movement of rack 86, arm 93 of latch 92 engages trip 111, which trip, on further downward movement (position B, Fig. 10), turns latch 92 in a counterclockwise direction releasing latch member 95 from lip 96 on bucket 27 permitting said bucket to turn in a clockwise direction on pivot 85 against the tension of spring 99 to position C, Fig. 10. Liquid is spilled from the bucket in this position. When bucket 27 is empty, the force exerted by the weight of table 19 and tray 62 on curved portion 107 of upright 87 through pin 108 is greater than the force exerted by the weight of rack 86 and empty bucket 27. Table 19, therefore, moves to the right, Fig. 10, and returns bucket 27, with the assistance of the tension of spring 99, to position B. Further movement of table 19 to the right moves rack 86 upwardly, spring 97 moving latch 92 downwardly until latch member 95 engages upwardly extending lip 96 on bucket 27 which locks the bucket in its normal position. Thereafter, further movement of table 19 to the right returns rack 86 and bucket 27 to its normal position where it is again filled with liquid. As in the embodiments of the invention illustrated in Figs. 1 to 8, bucket 27 is rapidly filled and rapidly emptied which filling and emptying is continuously repeated causing rapid reciprocation of the table 19 with tray 62 of dishes thereon.

Inasmuch as various modifications may be made in the forms of the apparatus herein disclosed and in the location and relative arrangement of the several parts of the invention without departing from the principles thereof, it will be understood that the invention is not to be limited excepting by the scope of the appended claims.

What is claimed is:

1. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, a table suspended in said chamber for reciprocal movement and adapted to receive said tray thereon so that the trav moves therewith, washing liquid distributing pipes arranged to discharge jets of liquid over the dishes on the tray, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising a pivot mounted in the chamber above the table, the pivot extending in a horizontal plane, a lever mounted intermediate the opposite ends thereof on said pivot to turn thereon, a liquid containing bucket having an opening at the top thereof and pivotally mounted on one end of the lever on an axis extending transversely to the longitudinal axis of the lever, the bucket being so disposed in respect to the lever that when it turns on said pivotal mounting it moves between an upright or filling

position and an emptying position, latch means cooperating with the bucket and the lever and arranged to normally maintain the bucket in said upright position, a spring acting on said bucket so that movement thereof from an upright position to an emptying position is against the tension of the spring, the tension of the spring being such as to move the bucket to said upright position when the bucket is free of the weight of liquid therein and permit movement to said emptying position by the weight of liquid therein when the latch means is released from said normal position, another spring acting on said lever adjacent the opposite end thereof so that movement of said one end of the lever and the bucket downwardly is against the tension of the other spring, said other spring exerting a force on the lever sufficient to maintain the bucket in an upper location when it is free of the weight of liquid therein and to permit movement of the bucket downwardly to said lower location by the weight of liquid therein, a trip member disposed to engage the latch means on the downward movement of said bucket and release the bucket for movement on its pivotal mounting, an actuating member comprising an arm secured to the lever and extending downwardly therefrom, an actuated member operatively associated with said table and engaging said arm so that said reciprocal movement of the arm by said lever reciprocates the actuated member and the table, means for circulating under pressure liquid from said distributing pipes after passage of fluid over the dishes, and liquid conduit means associated with the circulating means to receive liquid therefrom and with the bucket in its upper position to deliver said liquid thereto.

2. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, a table suspended in said chamber for reciprocal movement and adapted to receive said tray thereon so that the tray moves therewith, washing liquid distributing pipes arranged to discharge jets of liquid over the dishes on the tray, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising a pivot mounted in the chamber above the table, the pivot extending in a horizontal plane, a lever mounted intermediate the opposite ends thereof on said pivot to turn thereon, a liquid containing bucket fixedly mounted on one end of said lever to move therewith in an arc on the pivot in an upwardly and downwardly direction, said bucket being open at the top thereof and being so disposed in respect to the lever that the top thereof is in an upright or filling position when the bucket is in an upper location and in an emptying position when in a lower location, a spring acting on said lever adjacent the opposite end thereof so that movement of the bucket downwardly is against the tension of the spring, said spring exerting a force on the lever sufficient to maintain the bucket in said upper location when it is free of the weight of liquid therein and to permit movement of the bucket to said lower location by the weight of liquid therein, an arm so associated with the lever as to be reciprocated in an arc by movement of the lever on its pivot, an actuated link, an upright member secured to said table, the actuated link being pivotally secured adjacent one end thereof to said arm and pivotally mounted intermediate the opposite ends thereof on said upright so that said reciprocal movement of the arm reciprocates the actuated link and upright on the table, means for circulating under pressure liquid from said distributing pipes after passage of fluid over the dishes, and liquid conduit means associated with the circulating means to receive liquid therefrom and with the bucket in its upper position to deliver said liquid thereto.

3. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, a table suspended in said chamber for reciprocal movement and adapted to receive said tray thereon so that the tray moves therewith, washing liquid distributing pipes arranged to discharge jets of liquid over the dishes on the tray, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising a pivot mounted in the chamber above the table, the pivot extending in a horizontal plane, a lever mounted intermediate the opposite ends thereof on said pivot to turn thereon, a liquid containing bucket fixedly mounted on one end of said lever to move therewith in an arc on the pivot in an upwardly and downwardly direction, said bucket being open at the top thereof and being so disposed in respect to the lever that the top thereof is in an upright or filling position when the bucket is in an upper location and in an emptying position when in a lower location, an actuating bar pivotally mounted on said pivot independently of said lever, a latch member mounted on the lever and releasably engaging the operating bar, the arrangement being such that the bar moves on the pivot with said lever when the latch is in engagement with the bar, a spring acting on said lever adjacent the opposite end thereof so that movement of the bucket downwardly is against the tension of the spring, said spring exerting a force on the lever sufficient to maintain the bucket in said upper location when it is free of the weight of liquid therein and to permit movement of the bucket to said lower location by the weight of liquid therein, a trip member disposed to engage the latch on the downward movement of said bucket and release the latch from engagement with the operating bar, an actuated member operatively associated with said table and the operating bar so that said reciprocal movement of the lever and the operating bar prior to release of the latch from said bar reciprocates the actuated member and the table, means for circulating under pressure liquid from said distributing pipes after passage of fluid over the dishes, and liquid conduit means associated with the circulating means to receive liquid therefrom and with the bucket in its upper position to deliver said liquid thereto.

4. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, a table suspended in said chamber for reciprocal movement and adapted to receive said tray thereon so that the tray moves therewith, washing liquid distributing pipes arranged to discharge jets of liquid over the dishes on the tray, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising mounting means in the chamber disposed above the table, a vertically extending guide member, said mounting means being associated with the guide member so as to have reciprocal vertical upwardly and downwardly movement thereon, a liquid containing

bucket having an opening at the top thereof and pivotally mounted on the mounting means, the axis of the pivotal mounting extending in a horizontal plane, said bucket being so disposed on the pivotal mounting as to rotate between an upright or filling position to an emptying position, latch means cooperating with the bucket and the mounting means and arranged to normally maintain the bucket in said upright position, a spring acting on said bucket so that movement thereof from an upright position to an emptying position is against the tension of the spring, the tension of the spring being such as to move the bucket to said upright position when the bucket is free of the weight of liquid therein and permit movement to said emptying position by the weight of liquid therein when the latch means is released from said normal position, cam means associated with the mounting means and movable upwardly and downwardly therewith, said cam having an arcuate surface, an actuated member operatively associated with said table and bearing against said arcuate surface, the table and actuated member exerting a force on the cam sufficient to maintain the mounting means and the bucket in an upper location when the bucket is free of the weight of liquid therein and to permit movement of the bucket downwardly by the weight of liquid therein, a trip member disposed to engage the latch means on the downward movement of said mounting means and bucket and release the bucket for movement on said pivotal mounting to said emptying position, means for circulating under pressure liquid from said distributing pipes after passage of fluid over the dishes, and liquid conduit means associated with the circulating means to receive liquid therefrom and with the bucket in its upper position to deliver said liquid thereto.

5. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing fluid, said chamber having a washing fluid reservoir in the lower portion thereof, a table in said chamber mounted for reciprocal movement above said reservoir and adapted to receive said tray thereon so that the tray moves therewith, washing fluid distributing pipes arranged to discharge jets of fluid under pressure over the dishes on the tray, said tray and said distributing pipe being so positioned in relationship to the washing chamber that the jets of fluid after passing over the dishes on said tray flow into said reservoir, gravity operated actuating means for the table actuated by the weight of washing fluid, said actuating means comprising a liquid containing bucket in said casing and having an opening in the top thereof, bucket mounting means in the chamber, the mounting means and the bucket being so constructed and arranged that the bucket has reciprocal movement upwardly and downwardly in the chamber between an upper or filling position and a lower or emptying position wherein fluid in the bucket is emptied into the chamber, said bucket being disposed in the washing chamber above said reservoir and in a position to empty said fluid directly into the reservoir, force exerting means associated with the bucket so as to exert a force thereon toward said upper position, said force being such as to move the bucket to said upper position when the bucket is free of the weight of liquid therein and permit movement of the bucket to said emptying position by the weight of liquid therein, an actuating member so associated with the bucket as to be reciprocated by reciprocal movement of the bucket, an actuated member operatively associated with said table and the actuating member so that said reciprocal movement of the actuating member reciprocates the actuated member and the table, and means for conducting washing fluid from the reservoir to said bucket in its upper position.

6. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing fluid, said chamber having a washing fluid reservoir in the lower portion thereof, a table in said chamber mounted for reciprocal movement above said reservoir and adapted to receive said tray thereon so that the tray moves therewith, washing fluid distributing pipes arranged to discharge jets of fluid under pressure over the dishes on the tray, said tray and said distributing pipes being so positioned in relationship to the washing chamber that the jets of fluid after passing over the dishes on said tray flow into said reservoir, gravity operated actuating means for the table actuated by the weight of washing fluid, said actuating means comprising a liquid containing bucket in said casing and having an opening in the top thereof, bucket mounting means in the chamber, the mounting means and the bucket being so constructed and arranged that the bucket has reciprocal movement upwardly and downwardly in the chamber between an upper or filling position and a lower or emptying position wherein fluid in the bucket is emptied into the chamber, said bucket being disposed in the washing chamber above said reservoir and in a position to empty said fluid directly into the reservoir, force exerting means associated with the bucket so as to exert a force thereon toward said upper position, said force being such as to move the bucket to said upper position when the bucket is free of the weight of liquid therein and permit movement of the bucket to said emptying position by the weight of liquid therein, an actuating member so associated with the bucket as to be reciprocated by reciprocal movement of the bucket, an actuated member operatively associated with said table and the actuating member so that said reciprocal movement of the actuating member reciprocates the actuated member and the table, means for circulating washing fluid under pressure from said reservoir, and fluid conduit means associated with the circulating means to receive washing fluid therefrom and with the bucket in its upper position to deliver said fluid thereto.

7. In a dishwashing machine having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, said chamber having a washing liquid reservoir in the lower portion thereof, a table in said chamber mounted for reciprocal movement above said reservoir and adapted to receive said tray thereon so that the tray moves therewith, washing liquid distributing pipes arranged to discharge jets of liquid under pressure over the dishes on the tray, said tray and said distributing pipes being so positioned in relationship to the washing chamber that the jets of fluid after passing over the dishes on said tray flow into said reservoir, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising a liquid containing bucket in said casing and having an arcuate-shaped forward end and bottom, the bucket being open at the top thereof, bucket

mounting means in the chamber, the mounting means and the bucket being so constructed and arranged that the bucket is mounted with the top thereof disposed upwardly and to have reciprocal movement upwardly and downwardly in the chamber and reciprocal movement forwardly from an upper or filling position to a lower or emptying position wherein liquid in the bucket is emptied into the chamber and rearwardly from the emptying position to the upper position, said bucket being disposed in the washing chamber above said reservoir and in a position to empty said liquid into the reservoir, force exerting means associated with the bucket so as to exert a force thereon toward said upper position, said force being such as to move the bucket to said upper position when the bucket is free of the weight of liquid therein and permit movement of the bucket to said emptying position by the weight of liquid therein, an actuating member so associated with the bucket as to be reciprocated by reciprocal movement of the bucket, an actuated member operatively associated with said table and the actuating member so that said reciprocal movement of the actuating member reciprocates the actuated member and the table, and means for conducting washing liquid from the reservoir to said bucket in its upper position.

8. In a dishwashing machine having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, said chamber having a washing liquid reservoir in the lower portion thereof, a table in said chamber mounted for reciprocal movement above said reservoir and adapted to receive said tray thereon so that the tray moves therewith, washing liquid distributing pipes arranged to discharge jets of liquid under pressure over the dishes on the tray, said tray and said distributing pipes being so positioned in relationship to the washing chamber that the jets of fluid after passing over the dishes on said tray flow into said reservoir, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising a liquid containing bucket in said casing and having an arcuate-shaped forward end and bottom, the bucket being open at the top thereof, bucket mounting means in the chamber, the mounting means and the bucket being so constructed and arranged that the bucket is mounted with the top thereof disposed upwardly and to have reciprocal movement upwardly and downwardly in the chamber and reciprocal movement forwardly from an upper or filling position to a lower or emptying position wherein liquid in the bucket is emptied into the chamber and rearwardly from the emptying position to the upper position, said bucket being disposed in the washing chamber above said reservoir and in a position to empty said liquid into the reservoir, force exerting means associated with the bucket so as to exert a force thereon toward said upper position, said force being such as to move the bucket to said upper position when the bucket is free of the weight of liquid therein and permit movement of the bucket to said emptying position by the weight of liquid therein, an actuating member so associated with the bucket as to be reciprocated by reciprocal movement of the bucket, an actuated member operatively associated with said table and the actuating member so that said reciprocal movement of the actuating member reciprocates the actuated member and the table, means for circulating washing liquid under pressure from said reservoir, and liquid conduit means associated with the circulating means to receive washing liquid therefrom and with the bucket in its upper position to deliver said liquid thereto.

9. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, said chamber having a washing liquid reservoir in the lower portion thereof, a table in said chamber mounted for reciprocal movement above said reservoir and adapted to receive said tray thereon so that the tray moves therewith, washing liquid distributing pipes arranged to discharge jets of liquid under pressure over the dishes on the tray, said tray and said distributing pipes being so positioned in relationship to the washing chamber that the jets of liquid after passing over the dishes on said tray flow into said reservoir, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising a pivot mounted in the chamber and extending in a horizontal plane, a liquid containing bucket in said casing and mounted in radially spaced relationship with said pivot to move in an arm on the pivot in an upwardly and downwardly direction, said bucket being open at the top thereof and being so disposed in respect to the pivot that the top thereof is in an upright or filling position when the bucket is in an upper location and in an emptying position, said bucket being disposed in the washing chamber above said reservoir and in a position to empty said liquid into the reservoir when in a lower location, force exerting means associated with said bucket so as to exert a force thereon toward said upper location of the bucket, said force being such as to move the bucket to said upper location when the bucket is free of the weight of liquid therein and permit movement of the bucket to said lower location by the weight of liquid therein, an actuating member so associated with the bucket as to be reciprocated in an arc by movement of the bucket on said pivot, an actuated member operatively associated with said table and the actuating member so that said reciprocal movement of the actuating member reciprocates the actuated member and the table, means for circulating washing liquid under pressure from said reservoir, and liquid conduit means associated with the circulating means to receive washing liquid therefrom and with the bucket in its upper position to deliver said liquid thereto.

10. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, said chamber having a washing liquid reservoir in the lower portion thereof, a table in said chamber mounted for reciprocal movement above said reservoir and adapted to receive said tray thereon so that the tray moves therewith, washing fluid distributing pipes arranged to discharge jets of liquid under pressure over the dishes on the tray, said tray and said distributing pipes being so positioned in relationship to the washing chamber that the jets of liquid after passing over the dishes on said tray flow into said reservoir, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising a pivot mounted in the chamber and extending in a horizontal plane, a lever mounted intermediate the opposite ends thereof on said pivot to turn thereon, a liquid containing bucket in said casing disposed in the washing chamber above said reservoir and mounted on one end of said lever to move therewith in an arc

on the pivot in an upwardly and downwardly direction, said bucket being open at the top thereof and being so disposed in respect to said lever that the top thereof is in an upright or filling position when the bucket is in an upper location and in a position to empty said liquid into the reservoir when in a lower location, a spring acting on said lever adjacent the opposite end thereof so that movement of the bucket downwardly is against the tension of the spring, said spring exerting a force on the lever sufficient to maintain the bucket in said upper location when the bucket is free of the weight of liquid therein and permit movement of the bucket to said lower location by the weight of liquid therein, an actuating member so associated with the bucket as to be reciprocated in an arc by movement of the bucket on said pivot, an actuated member operatively associated with said table and the actuating member so that said reciprocal movement of the actuating member reciprocates the actuated member and the table, means for circulating washing liquid under pressure from said reservoir, and liquid conduit means associated with the circulating means to receive washing liquid therefrom and with the bucket in its upper position to deliver said liquid thereto

11. In dishwashing apparatus having a casing with a washing chamber therein wherein dishes disposed on a tray are washed by a washing liquid, said chamber having a washing liquid reservoir in the lower portion thereof, a table in said chamber mounted for reciprocal movement above said reservoir and adapted to receive said tray thereon so that the tray moves therewith, washing fluid distributing pipes arranged to discharge jets of liquid under pressure over the dishes on the tray, said tray and said distributing pipes being so positioned in relationship to the washing chamber that the jets of liquid after passing over the dishes on said tray flow into said reservoir, gravity operated actuating means for the table actuated by the weight of washing liquid, said actuating means comprising a pivot mounted in the chamber and extending in a horizontal plane, a lever mounted intermediate the opposite ends thereof on said pivot to turn thereon, a liquid containing bucket in said casing disposed in the washing chamber above said reservoir and mounted on one end of said lever to move therewith in an arc on

the pivot in an upwardly and downwardly direction, said bucket having an arcuate-shaped forward end and bottom, the bucket being open at the top thereof and being so disposed in respect to the lever that said forward end is radially outermost from said pivot and the top thereof is in an upright or filling position when the bucket is in an upper location and in a position to empty said liquid into the reservoir when in a lower location, a spring acting on said lever adjacent the opposite end thereof so that movement of the bucket downwardly is against the tension of the spring, said spring exerting a force on the lever sufficient to maintain the bucket in said upper location when the bucket is free of the weight of liquid therein and permit movement of the bucket to said lower location by the weight of liquid therein, an actuating member so associated with the bucket as to be reciprocated in an arc by movement of the bucket on said pivot, an actuated member operatively associated with said table and the actuating member so that said reciprocal movement of the actuating member reciprocates the actuated member and the table, means for circulating washing liquid under pressure from said reservoir, and liquid conduit means associated with the circulating means to receive washing liquid therefrom and with the bucket in its upper position to deliver said liquid thereto.

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