Aug. 28, 1962 G. M. GIBSON 3,051,182

FLUID CIRCULATING POWER MEANS FOR A DISHWASHING MACHINE

Filed Oct. 4, 1957

5 Sheets-Sheet 1

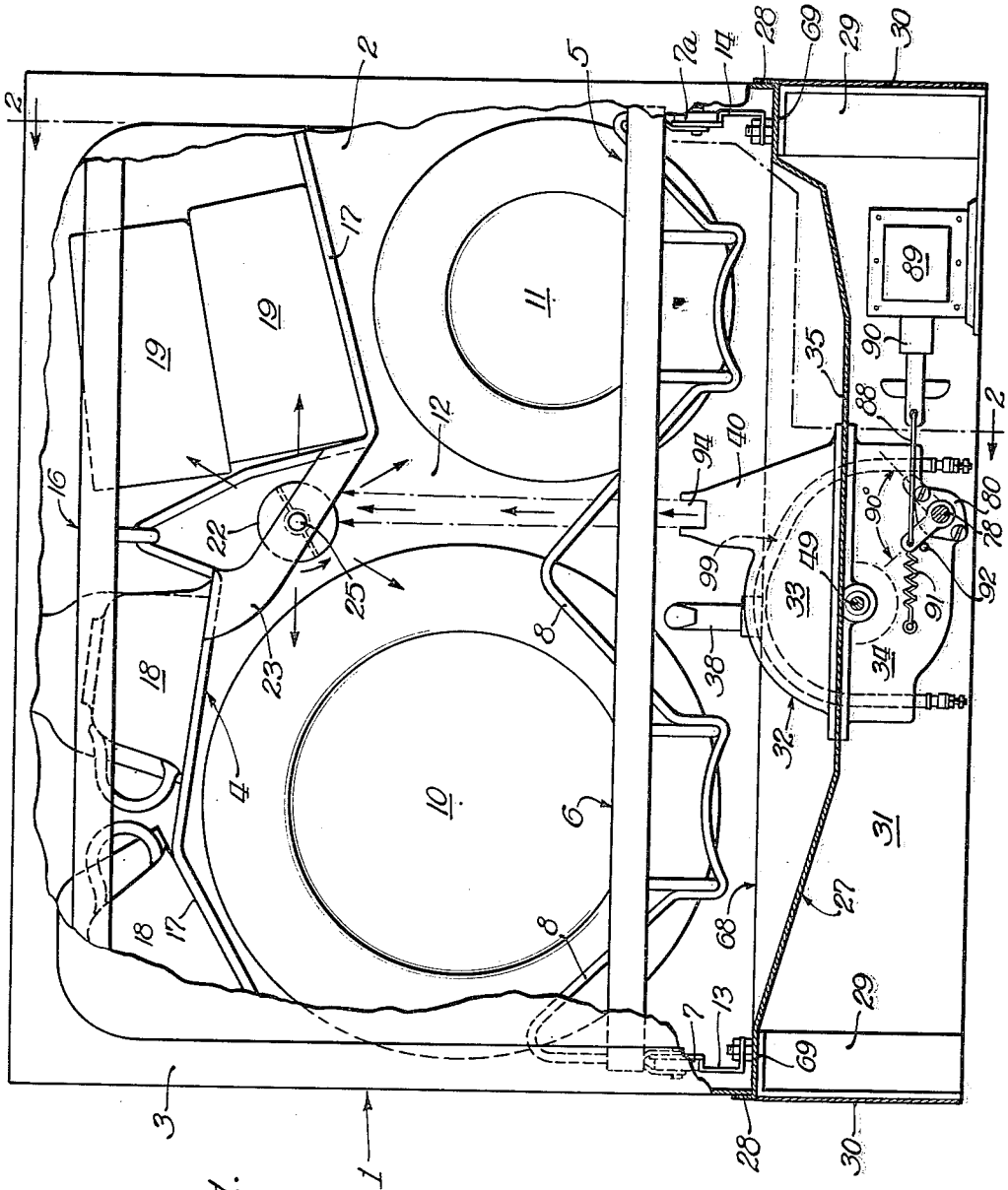


Fig. 1.

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5 Sheets-Sheet 2

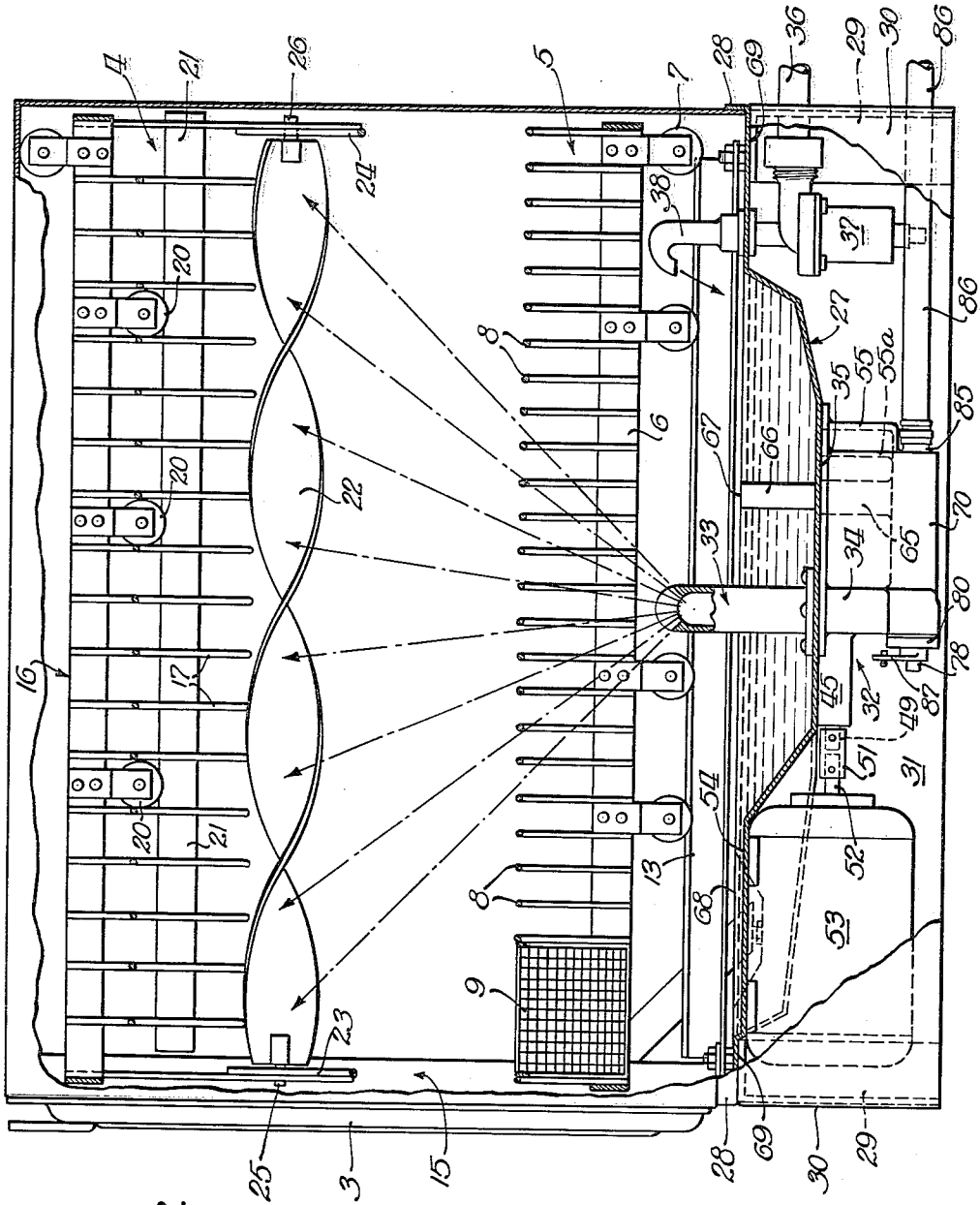


Fig. 2.

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Fig. 3.

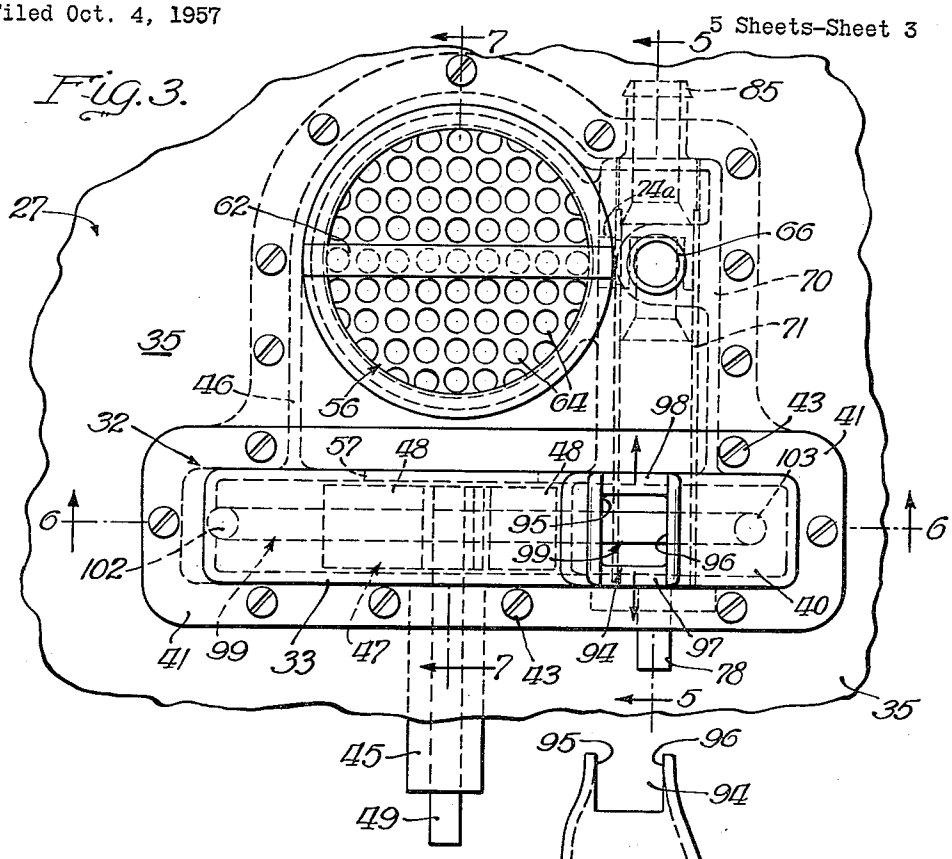
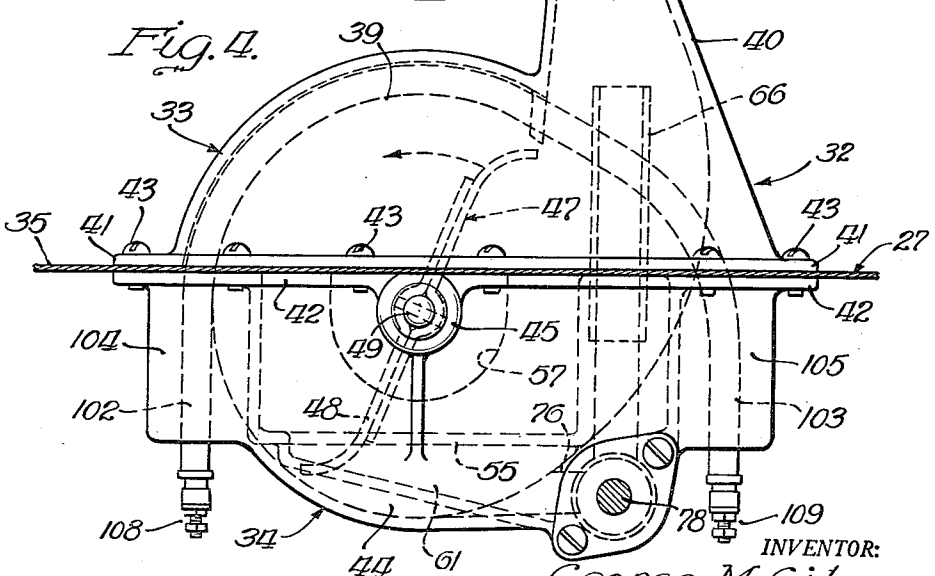


Fig. 4.



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FLUID CIRCULATING POWER MEANS FOR A DISHWASHING MACHINE

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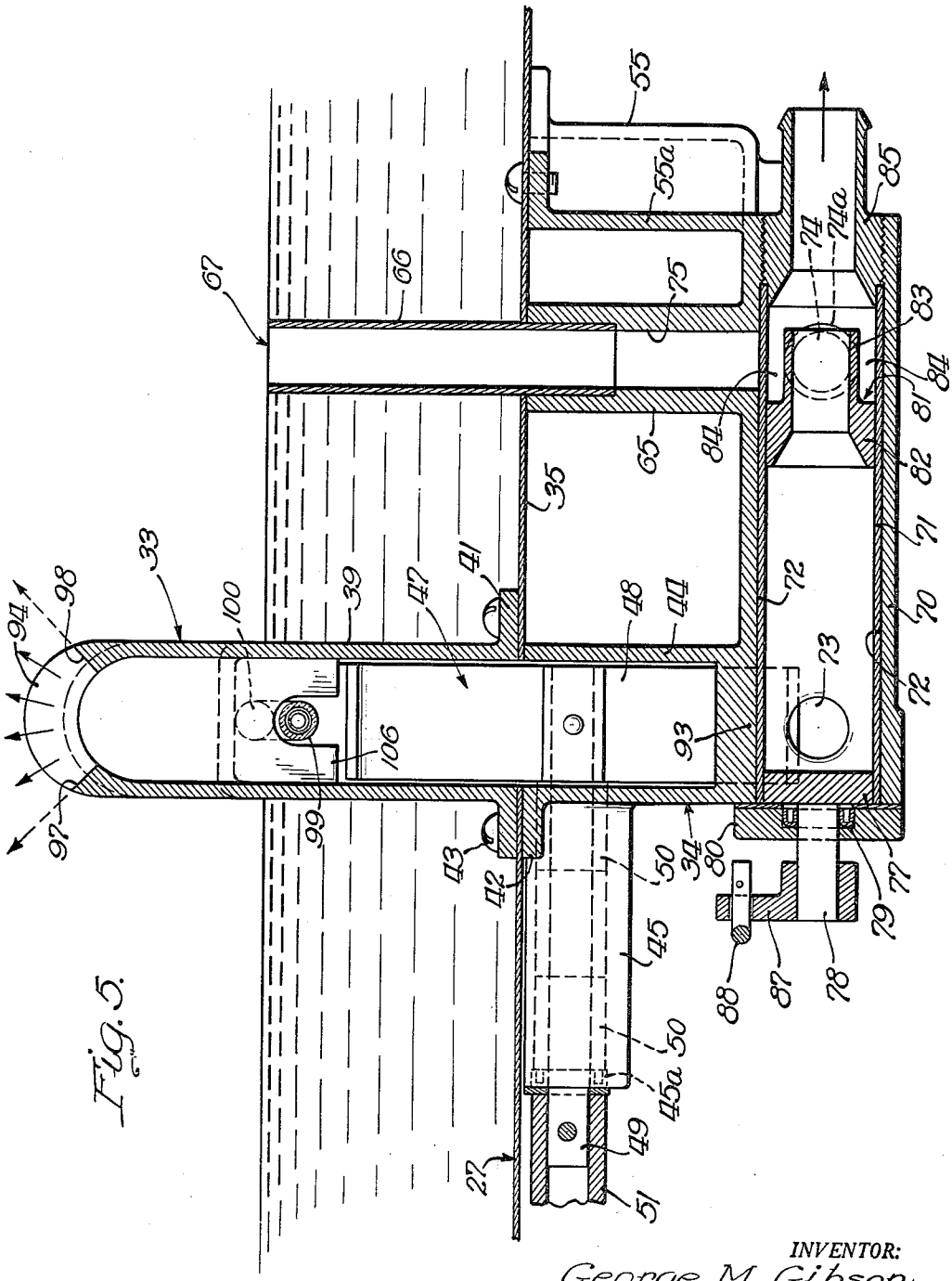


Fig. 5.

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Fig. 6.

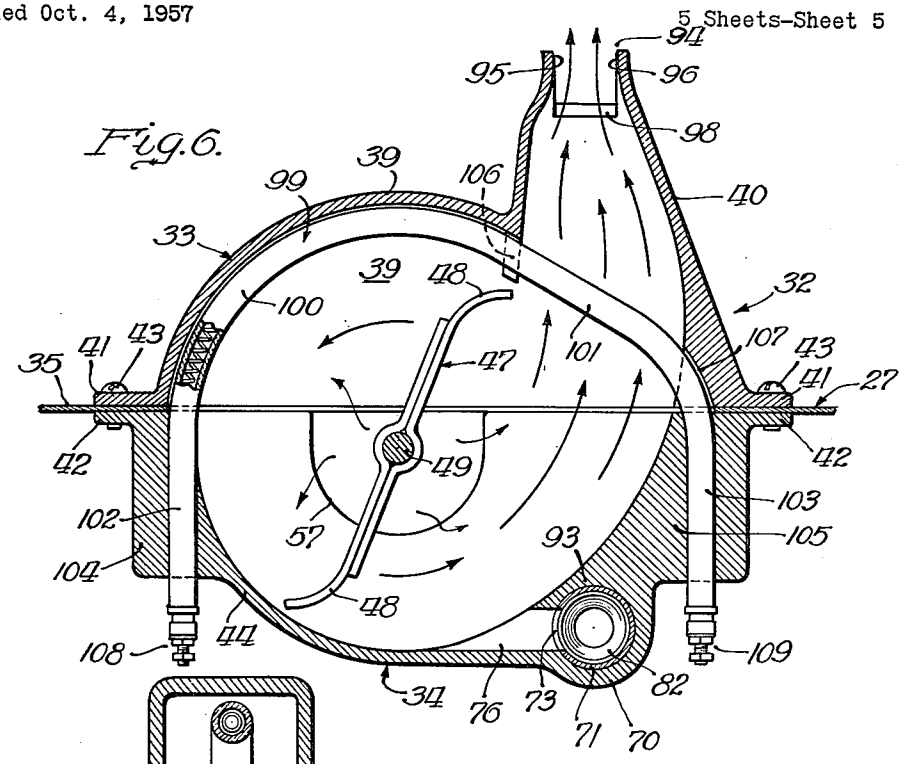
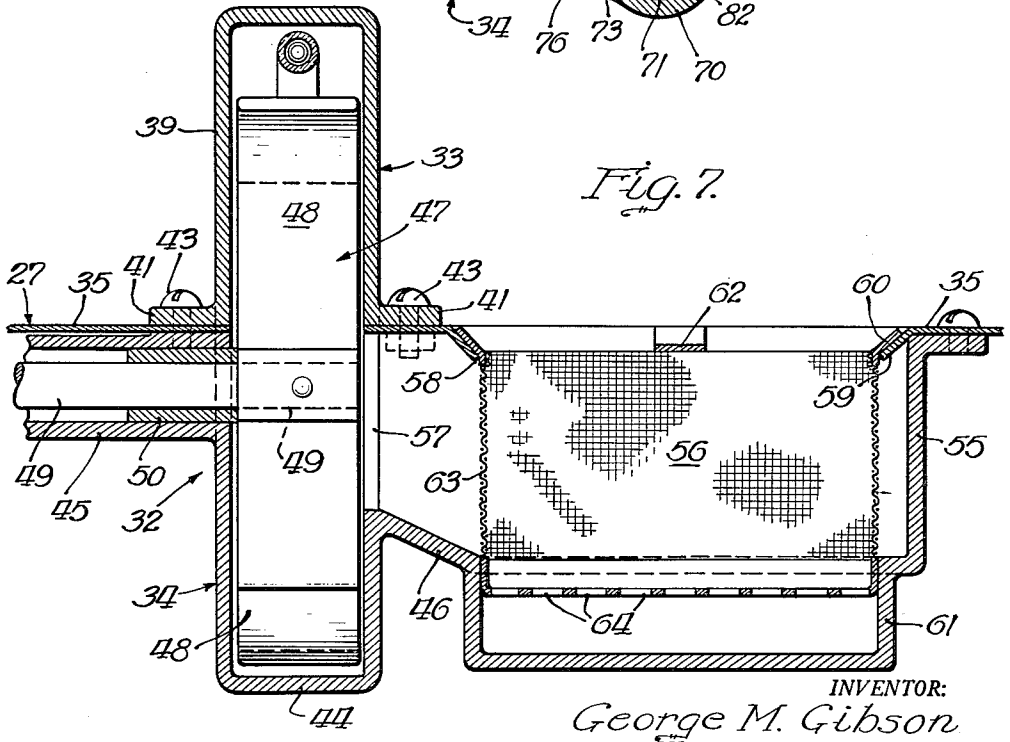


Fig. 7.



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United States Patent Office

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3,051,182

FLUID CIRCULATING POWER MEANS FOR A DISHWASHING MACHINE

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Filed Oct. 4, 1957, Ser. No. 688,247
26 Claims. (Cl. 134—108)

This invention relates to a fluid handling and distribution system for a dishwashing machine or similar apparatus.

More specifically, the invention is concerned with a specific construction of fluid circulating pump means adapted to pressurize the fluid and to direct such fluid in a predetermined manner whereby to carry out the complete washing cycle of the diswashing machine incorporating such motivating means.

While numerous means and mechanism have been devised to direct washing fluids against the various dishes in the cabinet of a dishwashing machine, it has been difficult to bring about efficient and complete fluid distribution that is coupled with economy of operation all conducted under a minimum of fluid supply in a specific reservoir means.

It is an object of this invention to provide a pump and coacting drain surface areas as a combination of apparatus that will efficiently handle a given minimum quantity of washing fluid for continuous reuse during the washing cycle or other stages of operation to direct said fluid in a continuous controlled stream aimed along a predetermined unobstructed path between certain groups of dishes and toward a fluid deflecting structure for reactionary dispersion of said fluid from a given point high within the cabinet and between or against the various dishes supported throughout the entire cabinet space.

Another object of this invention is to provide a fluid pump that includes fluid straining means to remove food particles and other foreign matter from the fluid as this fluid is recirculated by the pump according to the controlled path of operation of the fluid system within the dishwashing machine.

A further object of the invention is to provide a recirculating fluid pump having valving means to retain the washing fluid in the machine reservoir area and pump supply source under operating conditions and to selectively accelerate and bring about the quick discharge of the washing fluid under pressure to quickly empty the dishwashing machine when the cycle thereof is terminated.

Another object of the invention relates to the unique pump assembly together with the manner of incorporation of the heating means into the pump chamber to occupy a given position lying in the path of movement of the pump actuated fluid and also so as to occupy a position traversing the discharge portion of the pump where a portion of the heating means is in the path of the fluid being discharged by the pump into the dish holding compartment. The heating means is also built into the pump for efficient heat conduction and dissipation.

As another object, the pump is designed for separable two part assembly with the fluid reservoir area that is provided in the form of a fluid holding and collecting pan or reservoir occupying and forming the bottom of the dishwashing machine chamber.

Further objects and advantages relating to the fluid handling means and the combined mechanisms of the present invention shall hereinafter be further emphasized or become apparent from the following detailed description having reference to the exemplary construction shown in the accompanying drawings that form a part of this specification.

In the drawings:

FIG. 1 is a front elevational view of a dishwashing machine incorporating the principles of the invention therein to illustrate one preferred form of the fluid circulating and handling means; certain portions of the cabinet and adjacent parts being broken away and shown in section to better reveal some of the related structural features of this machine;

FIG. 2 is a longitudinal cross sectional view of the dishwashing machine as it appears when viewed substantially in the plane of the line 2—2 in FIG. 1;

FIG. 3 is an enlarged plan view of the pump structure and the surrounding portions of the machine lying adjacent said pressure and fluid source means;

FIG. 4 is a side elevational view of the pump structure seen in FIG. 3 and as viewed from the near side of that illustration;

FIG. 5 is a longitudinal cross sectional view of the pump structure taken on a vertical plane substantially as viewed along the plane of the line 5—5 in FIG. 3;

FIG. 6 is still another vertical cross sectional view of the pump structure as the same appears when viewed substantially along the plane of the line 6—6 in FIG. 3; and

FIG. 7 is a further vertical cross sectional view of the pump structure taken through the impeller chamber and the screened inlet sump and substantially as viewed along the plane of the line 7—7 in FIG. 3 that lies coincident with the impeller axis.

Attention is initially directed to the general illustrations in FIGS. 1 and 2 which show a dishwashing machine constructed according to the design of the machine that is more completely disclosed and explained in my copending application Serial No. 690,176, filed of even date herewith, and which relates to an Apparatus and Method of Washing Articles.

The machine herein disclosed comprises a cabinet 1 with a washing chamber 2, a swinging front door 3 and upper and lower mobile dish racks 4 and 5. The lower rack includes a composite frame 6 with wheels 7—7*a*, division wires 8 and a silverware tray 9. The frame 6 and the division wires are arranged to carry two rows of plates 10 and 11 that are spaced apart at their adjacent edges to provide a clearance channel 12 therebetween. A pair of cabinet rails 13 and 14 support the wheels 7 and 7*a* of the lower rack 5 to permit fore and aft movement of the composite frame 6 relative to the cabinet and in and out of the cabinet opening 15 controlled by the cabinet door 3.

The upper rack 4 includes a composite frame 16 and dish supporting rack wires 17 to carry dishes such as the cups 18 and glasses 19. Wheels 20 support the entire rack 4 upon rails 21 that are mounted upon opposite side walls of the cabinet 1, one rail 21 being illustrated in FIG. 2. Rack 4, like rack 5, can be moved into and out of the cabinet 1 through the cabinet opening 15 when door 3 is disposed in open position.

The upper rack 4 is further provided with a spiral vane 22 carried for free revolution upon supports 23 and 24 by means of the axially connected pintles 25 and 26 at the ends of the vane 22. The vane 22 is longitudinally arranged in a clearance space centrally and upwardly within the cabinet washing chamber 2 over the clearance space 12 and in a position wherein the dishes radially surround such a vane. This spiral unit provides a movable fluid deflector to break up and disperse the washing fluid that is directed thereagainst as will be further described. Reference may also be had to the copending application Serial No. 690,176, previously referred to for a more complete description of the washing machine and its method of operation.

The washing fluid supply and distribution source sys-

tem includes, generally, a reservoir pan 27 forming the cabinet bottom and having flanged portions 28 to receive the walls of the cabinet, said pan being carried and supported upon legs 29 with a suitable wrap-around apron or panel 30 encircling the legs to provide an enclosure 31 beneath the reservoir pan 27.

The propulsion or fluid impelling means includes a pump 32 formed as a two part housing assembly having coacting housings 33 and 34 disposed above and below the central dished floor 35 of the pan 27, with the housings secured through said floor to sandwich the latter therebetween as best illustrated in FIGS. 1 and 2. The pump 32 and pan 27 are the principal units of the fluid handling means of the dishwashing machine, with said pump directing the fluid from out of the pan in a predetermined stream against the deflecting unit comprising the spiral vane 22 for 360 degrees scattered and annularly movable distribution among and against the various articles supported within the cabinet.

The reservoir pan 27 is designed to hold approximately 1 to 1½ gallons of washing fluid to furnish the supply of fluid required to carry out the washing operation. The fluid supply to the pan is derived from a fluid line 36 connected through a solenoid controlled valve 37 for discharge through a gooseneck fitting 38 that directs the fluid into the reservoir pan 27 as best seen in FIG. 2. The maximum pan fluid level is controlled by overflow means associated with the pump 32 as will subsequently be described.

Pump 32 is shown in greater detail in FIGS. 3 to 7 and attention is directed to those illustrations. As shown in FIG. 6, housing 33 is divided into an upper impeller section 39, a discharge stack or nozzle 40 and includes a flanged base 41 that is superimposed upon a flanged top 42 connected with the lower housing 34, with suitable screw fastening members 43 connecting the housings through appropriate openings in the floor 35 of pan 27. Pan 27 is suitably cut out to accommodate the pump parts, and in general, the floor 35 terminates peripherally at the cut out so as to be coincident with the inner limits of the flanges of the housings as best shown in FIGS. 5, 6 and 7.

Pump housing 34 is divided into a lower impeller section 44 having a shaft bearing 45 at one side thereof and having a pump inlet section 46 at the other or opposite side of the impeller section 44. The pump impeller 47 operates within the two coacting impeller sections 39 and 44 of the housings and consists of a pair of connected vanes 48 secured to a drive shaft 49 journalled within sleeve bearings 50 located in the shaft bearing 45. Shaft 49 extends through a seal 45*a* out of the bearing 45 for connection with a coupling 51 that is secured to the end of the motor shaft 52 of the impeller drive motor 53 which is suitably supported within the lower chamber 31 and beneath the pan 27 of the cabinet 1. The contour of the reservoir pan is such as to provide the lower bottom extremity of the pan 27 defined by the floor 35 and to also provide an upwardly convex section 54 to accommodate the suitably supported motor 53 as best illustrated in FIG. 2.

The inlet portion of the pump 32 includes the section 46 that communicates with an inlet sump 55 carrying a screen 56 for straining the washing fluid as it drains into the sump 55 from the floor 35 of pan 27. The washing machine fluid is supplied to the pump 32 through the inlet section 46 communicating with the pump inlet opening 57 in the sump side wall of housing 34. Floor 35 of the pan 27 has a circular opening 58 outlined by a downwardly beveled flange 59 that is provided to carry the outwardly flared lip 60 of screen 56 and to align the lower end of the screen for orientation with sump bottom drain chamber 61.

The screen 56 includes a diametral strap 62 at its top to provide a hand or finger piece to lift and remove the screen for cleaning purposes. Screen 56 is constructed as a composite structure having an annular fine mesh screen 63 disposed in the fluid supply zone for the pump and having a coarse mesh bottom screen 64 located in the sump bottom drain chamber 61 to permit most of the food and other foreign particles to pass out of the screen into the chamber 61 for subsequent passage out of the drain structure of the machine. Any of the larger pieces of residue in the washing fluid are retained within the screen for subsequent removal by lifting the screen out of chamber 55. In this manner, obstruction of the drain structure due to large particles of food or the like is prevented to thereby insure continued efficient and proper functional operation of the fluid handling system of the machine at all times.

The screen means 56 is located axially with respect to the pump and at one side of the pump structure. Sump 55 includes a laterally located vertically arranged extension that provides a hollow standard 65 that carries an overflow sleeve 66 terminating at 67 for water level control at an elevation which, in the construction illustrated, is substantially coincident with the top level 68 of the self portion 69 of the reservoir pan 27.

As further best seen in FIGS. 3, 4, 5 and 6, a valve barrel 70 is longitudinally arranged in a vertical plane that is coincident with the axis of the standard 65 and parallel to the pump axis to place the barrel in offset relation to one side of the pump chamber so as to flank the lower part of the latter. A rotary valve sleeve 71 is fitted into the bore 72 of the valve barrel 70 and the sleeve is provided with two spaced ports 73 and 74. Port 74 is positioned to line up with the bore 75 in the hollow standard 65 for fluid communication at the maximum fluid level between the reservoir fluid through the overflow sleeve 66, bore 75 and the interior of the valve sleeve 71 whenever port 74 is rotated for axial alignment with bore 75. The port 73 is positioned for alignment with a fluid discharge bore 76 in housing 34 to communicate with the lower part of the pump impeller chamber in the housing 34 for drainage purposes when emptying the machine reservoir.

With the valve sleeve 71 disposed as in FIG. 5, port 74 lines up with a duct or port 74*a* formed in barrel 70 (see FIG. 3) that communicates with the interior of the sump bottom drain chamber 61 and also through screen 56 within the sump 55.

The valve sleeve structure is further provided with a plug 77 tightly fitted into the valve sleeve 71 and which plug carries a stem 78 for rotational operation through a gland 79 and cover 80. A fitting 81 is tightly secured into the sleeve 71 by means of a circular fastening base 82 having a nozzle 83 producing an annular discharge space 84 within the valve sleeve 71 that opens outwardly in the direction of a fixed hose nipple 85 that is secured into the barrel 70 to receive a drain hose such as 86 in FIG. 2 whereby to accommodate fluid drainage.

Operation of the valve sleeve 71 is confined to a 90 degree rotary motion through actuation of an arm 87 by means of a link 88 that is held in one position by the energization of a solenoid 89 to draw the core 90 to the right as shown in FIG. 1 and by means of a spring 91 normally holding arm 87 to the left against a suitable stop 92. The stop position places the valve sleeve in a position wherein the ports 73 and 74 are located as they appear in FIGS. 5 and 6 which is the emptying position of the valve ports. When the solenoid 89 is operated, the valve is turned 90 degrees to close port 73 against the wall portion 93 of the housing 34 and to align port 74 with bore 75 for overflow purposes, the latter angular position of the valve sleeve 71 being the setting of such valve during the operation of the dishwashing machine.

When the pump impeller 47 is driven by the motor 53, fluid is drawn into the pump chamber from the sump 55 through the fine wire mesh 63 of screen 56 and through the inlet opening section of the sump 55 and out of the opening 57 is housing 34 as best illustrated in FIGS. 6

and 7. Impeller 47 is rotated in a counterclockwise direction in FIG. 6 carrying the fluid about the chamber of the dual housings 33 and 34 to spiral the fluid off into the stack or nozzle 40 that occupies a tangential offshoot position for fluid discharge. The discharge mouth 94 of the stack or nozzle 40 is terminated with flat sides as shown at 95 and 96 in FIG. 6 and the mouth 94 is flared at its ends as at 97 or 98 as seen in FIG. 5 to give the discharging fluid a fan shaped discharge directed in a general plane coincident with the spiral vane 22. The flat sides 95 and 96 hold the fluid discharge stream generally to a predetermined thickness or width when considered in a direction taken at right angles to the spiral vane 22. This stream of washing fluid is directed to continually strike the vane 22 generally at one side of the rotative axis of such a vane to thereby drive the vane continuously in a counterclockwise direction as seen in FIG. 1.

The washing or other stage or cycle includes a recirculation of the washing fluid. Heating means is further provided to heat the fluid while under recirculation. Such a means is provided in the form of a Calorod assembly 99 consisting of an arc section 100 following the pump chamber contour, a bridging section 101 and two anchor or end sections 102 and 103 that are molded or otherwise fixedly secured into the heavy sections 104 and 105 of the housing 34 of the pump assembly. A slotted depending web 106 provides means to straddle and stabilize the upstanding portion of the Calorod assembly 99. A portion 107 is cut out of the housing 34 to accommodate an adjacent end portion of the heating element assembly. In addition, suitable terminals 108 and 109 are provided for connection with the anchor or end sections 102 and 103 of the heating element assembly for connection with an electrical current source to energize the heating means of the Calorod member during the proper and desired stage of the washing cycle.

The two piece pump lying in line with the general horizontal plane of the pan bottom 35, with housing 33 above the floor 35 of pan 27 and housing 34 below such floor, the incorporation of the arcuate and rigid upstanding heating element assembly 99 provides a very practical and efficient construction both in the manner of assembly or disassembly of the pump and also in the functioning and operation of the fluid recirculation means for causing the fluid ejection out of the mouth 94 of the pump toward the location of the spiral vane 22. The anchored end sections 102 and 103 transmit considerable heat to the housing 34 which is conducted to the pan 27 and the housing 33. The proximity of the arc section 100 to the top of the housing 33 further enhances the heat conduction and radiation to the pump assembly as a whole which includes the discharge stack 40 for the pump fluid exit aimed in the direction of the vane 22 through the space between the dishes in the cabinet 1.

During the washing cycle, the fluid is actuated annularly through the pump and partially along the path occupied by the heating element. The fluid discharges out of the pump chamber across the bridging section 101 of the assembly 99 for final discharge out of the stack or nozzle 40 to be directed by the mouth 94 toward the spiral vane 22 in the manner previously described.

While no particular cyclic order of operation has been pointed out, it is to be understood that suitable conventional electrical control means can be incorporated into this machine to cause specific prewetting, washing, emptying and rinsing stages to be carried out to obtain an efficient and practical washing cycle of operational steps in a machine of this character. The filling stages can be controlled by the solenoid valve 37. The washing and rinsing stages can be conducted by operation of the motor and pump, either with heat or without heat as may be established by the selective energization of the heating assembly 99. The emptying stage can be conducted with the rotary valve sleeve 71 disposed in the position shown in FIG. 5 and with pump impeller 47 in operation, the fluid being thus propelled out of pump 32 through the bore 76, port 73, through the valve sleeve 71, nipple or nozzle 83 and finally into and through the fitting 85 and out of the drain hose 86. Nozzle 83 provides a fluid ejection means that directs the fluid from the pump in a straight path to discharge in the fashion contemplated under the pump pressure draining cycle. The fluid and/or sediment in portions of the pan 27, sump 55, screen 56, and more specifically in the sump bottom drain chamber 61 are drawn out through the ports 74*a* and 74 and space 84 to be directed outwardly toward the drain by the ejector action of pump fluid through the nozzle 83.

In addition to the above, the overflow means 65, 66 and 75 remain functioning and operative at all times during the operation of the preheating washing or rinsing cycles as desired during the time the valve sleeve 71 and arm 87 are kept in the right hand 90 degree position as indicated in broken lines in FIG. 1 which condition would prevail when the solenoid 89 is under energization.

Any of the stages suggested may readily be repeated if required and with suitable timing means in the electrical control circuit, the periods of the various stages can be readily carried out to provide a given sequence of steps and a given length of operation for such various steps.

While the foregoing description has been confined to one form of the invention which is more or less specifically disclosed in the drawings, the description and disclosure are only submitted for purposes of illustration and not for purposes of limitation. Certain changes in the exact construction of the individual elements defined or in the various combinations of elements are contemplated and deemed feasible without departing from the fundamental concept of the invention herein presented. The extent of such permissible modifications or changes shall, however, be governed by the breadth and scope of the language set forth in the appended claimed subject matter that is directed to the new and novel features of the fluid handling means of the instant invention.

What I claim is:

1. In a dishwashing machine cabinet, a fluid handling system adapted for the distribution and recirculation of said fluid within said cabinet comprising a fluid collecting pan having an opening therein, a pump connected with said pan and having a separable housing supporting and confining a fluid actuating impeller, said housing providing top and bottom portions secured to opposite faces of said pan respectively and extending about the opening in the latter, inlet means for said housing connected with the pan through another opening therein to draw fluid therefrom, and said housing having a discharge throat positioned upwardly and outwardly of said pan to direct impeller propelled fluid into said cabinet, and said pump providing means to recirculate the fluid returned to said fluid collecting pan from within said cabinet.

2. In a dishwashing machine cabinet and fluid handling system as in claim 1, wherein said fluid inlet means is disposed between said fluid collecting pan and said pump beneath said pan and comprises a sump having a screen unit interposed between the pan and pump, and a drain structure is provided independently of said fluid inlet means leading from said sump and having separate connection with said pump, said drain structure having a valve to control fluid flow to drain from said pump and sump.

3. In the combination of claim 2, an overflow means connected with said drain structure to provide a given maximum limit of fluid level in said pan, said valve providing means to selectively control the free flow of fluid out of said overflow and through said drain structure.

4. A fluid system for a dishwashing machine cabinet comprising a drain pan reservoir for said cabinet having a wall with an opening therein, a pump adapted to draw fluid out of said pan and to direct said fluid into the cabinet, said pump having a divided impeller casing assembled to said pan for support therefrom and enclosing the space at either side of said wall opening, said divided casing and

the peripheral edges of said wall opening together defining an impeller housing, an impeller mounted in said housing, said pump having a fluid inlet portion connected with said pan through an opening therein, and a fluid discharge portion on said pump disposed above the adjacent area of said pan wall and arranged to propel fluid and in the direction of said cabinet.

5. A fluid system for a dishwashing machine cabinet comprising a drain pan reservoir for said cabinet, a pump adapted to draw fluid out of said pan and to direct said fluid into the cabinet, said pump being assembled to said pan for support therefrom, said pump comprising a fluid inlet portion connected with said pan, and a fluid discharge portion projecting above the adjacent area of said pan and in the direction of said cabinet, said pump having a composite separable impeller housing with one section thereof disposed below said pan and another section above the pan, said pan having an opening therethrough with said pump sections each having adjacent portions thereof surrounding said pan opening.

6. In a combination as set forth in claim 5, a pump impeller mounted upon one of said sections and operating in both through said drain pan reservoir opening.

7. In a combination as set forth in claim 5, a heating unit connected with one of said sections and arranged to project outwardly thereof to extend into the other of said sections through said drain pan reservoir opening.

8. Fluid circulating mechanism comprising a drain pan fluid reservoir providing a drain floor, a pump secured to said floor to receive a fluid supply from the drain floor and having an inlet section connected with a separable outlet section including a fluid discharge stack, an impeller operating within both sections to move fluid from the inlet section out of the stack of the discharge section, and heating means carried by one of said sections and extending outwardly therefrom to project freely into the fluid cavity of the other of said sections, said one section coacting with the other of said sections to orient the heating means in a given relation in said other section to lie in the path of the fluid being actuated through the other section by the impeller of said pump.

9. Fluid circulating mechanism comprising a drain pan reservoir having a drain floor, a pump, a fluid inlet structure for said pump connected with said drain floor, a sump in said inlet structure to receive fluid from said reservoir for communication with said pump, overflow means for said reservoir to govern the maximum fluid level for said drain pan reservoir, and a fluid drain means, valve means to control the fluid movement in said system comprising a valve chamber having independent access openings providing individual communication with said pump, said sump, said overflow means and said drain means, and a valve for said chamber interposed between said independent access openings to regulate fluid flow between certain of said access openings and the access opening to said drain means, said valve having ports arranged to open said overflow means to said drain means while shutting off said pump and sump access openings when said valve is disposed in one position, and said valve ports functioning to open said pump and sump access openings to said drain means while closing off the access opening for said overflow means when said valve is disposed in another position.

10. Fluid circulating mechanism comprising a drain pan reservoir, a pump, a fluid inlet structure for said pump connected with said reservoir and communicating with said pump, a sediment sump in said inlet structure, drain means having communication with the discharge side of said pump and with said sump to permit gravity drainage of a portion of the reservoir fluid out of the sump, and valve means to regulate the flow of fluid between said pump, sump, and drain means including a valve arranged to close off fluid access from said pump and sump to said drain means when said valve is disposed in one position, said valve functioning to permit fluid discharge access from said pump and fluid drainage from said sump to said drain means when said valve is disposed in another position, said pump providing operative means to withdraw fluid from said drain pan reservoir through said pump and out of said sump under operation with said valve in said second position, and fluid injector means located adjacent said sump fluid access opening and operated by said fluid discharged under pressure by said pump to provide fluid power withdrawal means whereby to draw fluid out of the sump during the fluid drain position of said valve.

11. A fluid system for a dishwashing machine cabinet comprising a drain pan reservoir for said cabinet, a pump adapted to draw fluid out of said pan and to direct said fluid into the cabinet, said pump being assembled to said pan for support therefrom, said pump comprising a fluid inlet portion connected with said pan, and a fluid discharge portion projecting above the adjacent area of said pan and in the direction of said cabinet, said pump having a composite separable impeller housing with one section thereof disposed below said pan and another section above the pan, said pan having an opening therethrough with said pump sections each having adjacent portions thereof surrounding said pan opening, at least one of said pump sections having means to support said impeller for operation in both of said sections through said drain pan reservoir opening, and said pump including a heating unit connected with one of said sections and arranged to project outwardly of said one section to extend into the other of said sections through said drain pan reservoir opening, said other section of said pump having a fluid discharge stack directed toward the cabinet, said heating unit being intimately secured into said first section for heat conduction thereto with said projecting portion of said heating unit following the second section of the pump in close proximity thereto for heat conduction and radiation purposes, said projecting portion of said heating unit being disposed to bridge the fluid discharge portion of said stack for further heat transmission to said fluid.

12. Fluid circulating apparatus to draw fluid from a reservoir and to discharge said fluid out of said reservoir comprising, in combination, a reservoir wall and a pump, said pump comprising two sections flanking opposite sides of said wall, said wall having an aperture between said sections, and said pump having an impeller operating within said sections and through said wall aperture, said pump sections having inlet means connected with said reservoir and discharge means arranged to impel fluid out of said reservoir, and a heating unit for said pump having portions thereof anchored in one pump section and including a projected portion to enter the other of said pump sections, said projected portion including a bridging section arranged to span the interior of said discharge means of said pump sections.

13. In a dishwashing machine having a cabinet and a fluid distribution means to direct washing fluid into said cabinet, said fluid distribution means comprising a fluid reservoir and a fluid pump, said reservoir providing an apertured bottom wall and said pump having coacting housing portions thereof straddling said bottom wall of said aperture, a fluid impeller for said pump operating within said housings and through said wall aperture, said pump having an inlet structure disposed below the elevation of said wall and having connection with said reservoir and said pump having a fluid outlet structure disposed above the elevation of said wall in the reservoir fluid area and including a fixed fluid outlet nozzle terminating above the normal fluid level in said reservoir and arranged to direct said fluid into said cabinet from a fixed point of discharge.

14. A fluid circulating apparatus comprising a pump having a divided casing provided with connected parts that are separable along a selected joining plane, a fluid impeller operable within said casing, and a heating unit within said pump to supply heat directly to the fluid circui-

lated through said casing by said impeller, said heating unit being mounted for support within one of said casing parts and projecting out of that casing part into a position beyond the joining plane of the parts for orientation within the open fluid cavity of the other of said casing parts and in a location lying within the path of flow of the impeller actuated fluid through the casing cavity of the pump.

15. A fluid circulating apparatus as defined in claim 21 wherein said casings include a fluid inlet flow structure and a fluid outlet flow structure, and wherein said heating unit includes a section disposed to freely bridge one of fluid flow structures in the path of the fluid passage therethrough.

16. A fluid circulating apparatus defined in claim 14 wherein said heating unit comprises an assembly having a fluid impervious housing to segregate said heating unit from contact with the fluid passing through the fluid cavity of the casing.

17. A fluid circulating apparatus defined in claim 14 wherein said heating unit comprises an electrical heating element completely shielded and protected within the open fluid cavity of the casing by a fluid impervious housing.

18. In a dishwashing machine comprising, in combination, a cabinet, a fluid distribution means to direct a stream of fluid into the cabinet, said fluid distribution means comprising a reservoir having a fluid collecting wall forming the bottom enclosure of said cabinet, and a pump for said reservoir comprising a separable housing having coacting parts thereof supported both within and below said reservoir wall, said wall being open between said pump parts, and a pump impeller supported within said housings to actuate the fluid through the pump, a fluid inlet structure connected to supply fluid from said reservoir to one of the coacting pump parts below the reservoir wall, and a fluid outlet nozzle structure connected with the other of said pump parts and disposed with the terminal end of the nozzle arranged to impel fluid into the cabinet from an elevated point located above the normal maximum level of the fluid of said reservoir.

19. In a dishwashing machine combination as in claim 18, wherein said fluid inlet structure of said one pump part incorporates a sump connected with said reservoir beneath the fluid collecting wall thereof, said sump having communication with the interiors of both of the pump housing parts, and wherein a removable screen unit is carried within said sump to counteract the passage of sediment and foreign particles from the sump into the pump housing parts.

20. In a dishwashing machine combination as in claim 18, an overflow means to maintain the reservoir fluid at or below a predetermined maximum level in said reservoir, a drain means in said pump including a connection with said overflow means, and valve means interposed between said pump and the overflow means to selectively connect said pump for fluid discharge through said drain means while said valve means closes off the overflow means, or to connect said overflow means with said drain means while the valve means closes off said pump therefrom.

21. Fluid circulating mechanism comprising a drain pan reservoir, a pump, a fluid inlet structure for said pump connected with said reservoir and communicating with said pump, a sediment sump in said inlet structure, drain means having communication with the discharge side of said pump and communicating with said sump to permit gravity drainage of a portion of the reservoir fluid therethrough into said drain means and valve means to regulate the flow of fluid between said pump, sump and drain means including a valve arranged to close off fluid access from said pump and sump to said drain means when said valve is disposed in one position, said valve functioning to permit fluid access from said pump and said sump with said drain means when said valve is disposed in another position, said pump providing operative means to withdraw fluid from said drain pan reservoir through said pump and through said sump under operation with said valve in said second position, said sump having a removable screen unit seated therein comprising a fine mesh screen coacting with one portion of said fluid inlet structure and adapted to strain and bypass reservoir fluid being drawn into said pump, and having a coarse screen section coacting with another portion of said inlet structure and adapted to strain and bypass reservoir fluid passing from the sump into said drain means.

22. In an article washing machine, in combination, a fluid reservoir, a sump therebelow to accept fluid from said reservoir a pump to circulate fluid from said reservoir through said sump into the article washing area, said sump having a sediment collecting drain chamber in the lower portion thereof and a fluid inlet section for said pump leading from said sump at a level above the sediment collecting drain chamber thereof, drain means communicating with said sediment collecting drain chamber of said sump, and a screen assembly carried within said sump comprising a first screen having openings of one predetermined size disposed to cover the fluid inlet section of the sump leading from the sump to the pump, and a second screen having openings of another predetermined size adapted to intercept the flow of fluid from said sediment collecting drain chamber of said sump to said drain means.

23. In an article washing machine, in combination, a fluid reservoir providing a sump, a pump to circulate fluid from said reservoir sump into the article washing area, said sump having a sediment drain chamber communicating with a drain means and having a fluid inlet section communicating with said pump, and a screen assembly carried with said sump comprising a first screen having openings of predetermined size to cover the fluid inlet section leading from the sump to the pump, and a second screen having openings of another predetermined size to intercept the flow of fluid from said sump to said drain means, said sump being circular in cross section, said pump inlet section leading radially outwardly from the sump with the sediment drain chamber depending from the bottom portion of the sump, and said screened assembly being bodily removable and shaped to provide circular screens to function in their respective capacities without reorientation upon removal and reinsertion after inspection for cleaning.

24. In an article washing machine, in combination, a fluid reservoir, a sump below the reservoir and communicating therewith to establish a sediment accumulating means, a pump to direct reservoir fluid into the article washing area, said sump comprising a bowl having a fluid supply outlet formed annularly thereabout with a fluid supply section provided for connection with the inlet portion of the pump and having a drain outlet at the lower portion thereof below said bowl fluid outlet, and a screen unit carried within said bowl comprising a fine mesh screen to intercept the flow of fluid from said bowl outlet into the fluid supply section of the bowl leading to the pump, and a coarse screen to radially divide said bowl at a point below said fluid supply outlet portion thereof to intercept the flow of fluid from said bowl passing into said drain outlet.

25. In an article washing machine, in combination, a fluid reservoir, a sump to establish a sediment accumulating means, a pump to direct reservoir fluid into the article washing area, said sump comprising a bowl having a side outlet for connection with the inlet portion of the pump and having a drain outlet at the bottom thereof, and a screen unit carried within said sump comprising a fine mesh screen to intercept the flow of fluid from said sump into the side outlet leading to the pump, and a coarse screen to span said bowl to intercept the flow of fluid from said sump into said drain outlet, said screen unit being divided into two vertically superimposed screen parts to

serve said side outlet of the bowl and the drain outlet respectively, said bowl and screen unit having coacting means to orient the screen unit in a given relation within said bowl whereby said screen parts are positioned to serve the flow of fluid from the sump into the two named outlets respectively.

26. The combination of claim 24, wherein said screen unit is divided into two contiguous screen parts with the one screen part thereof serving said supply fluid outlet and dividing the bowl vertically into strained and unstrained zones, and said other screen part serving said drain outlet dividing said bowl horizontally into strained and unstrained zones.

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