

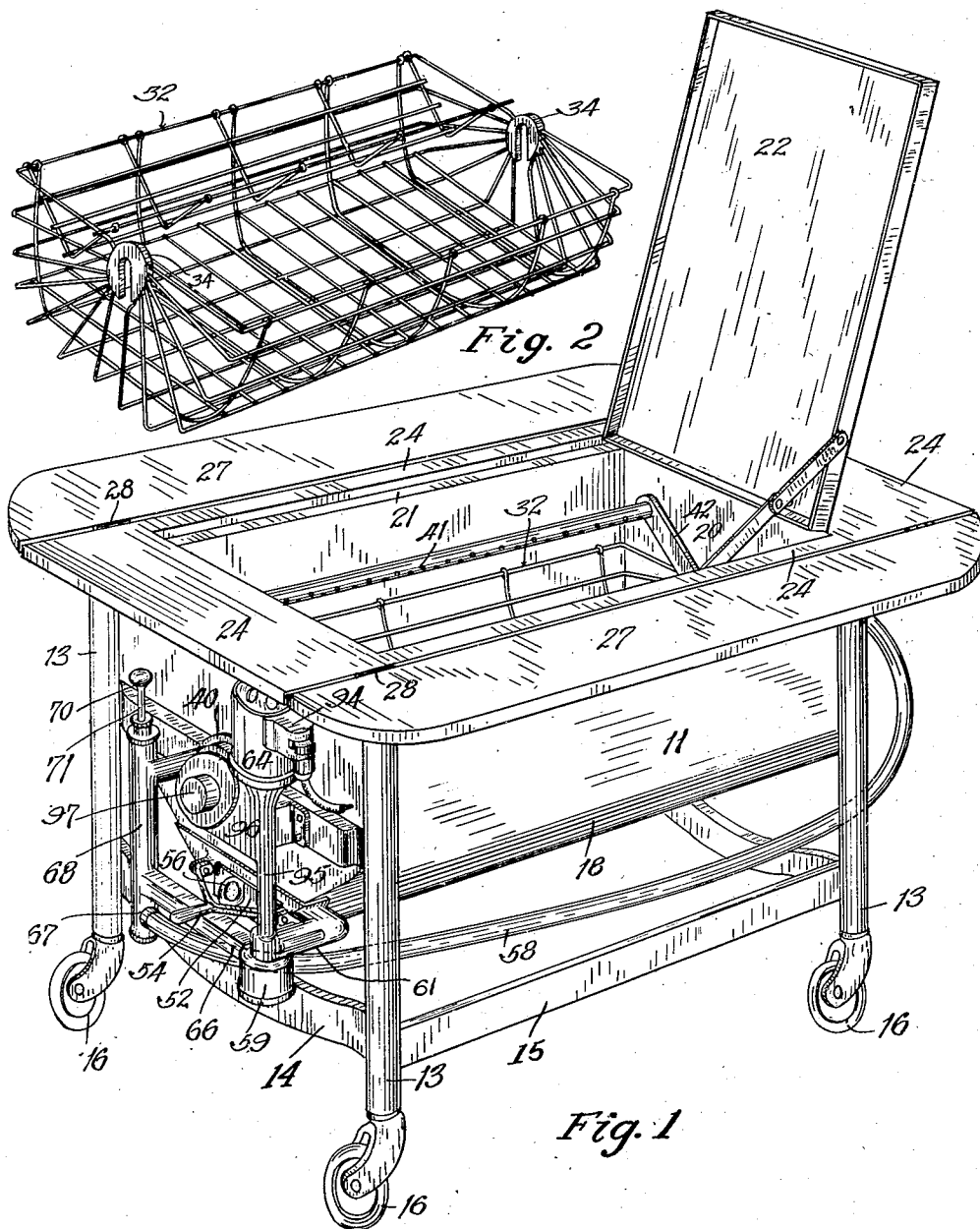
Sept. 19, 1933.

J. B. KIRBY

1,927,665

DISHWASHING MACHINE

Original Filed Nov. 19, 1926 3 Sheets-Sheet 1



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INVENTOR  
BY *Smith and Freeman*  
ATTORNEYS

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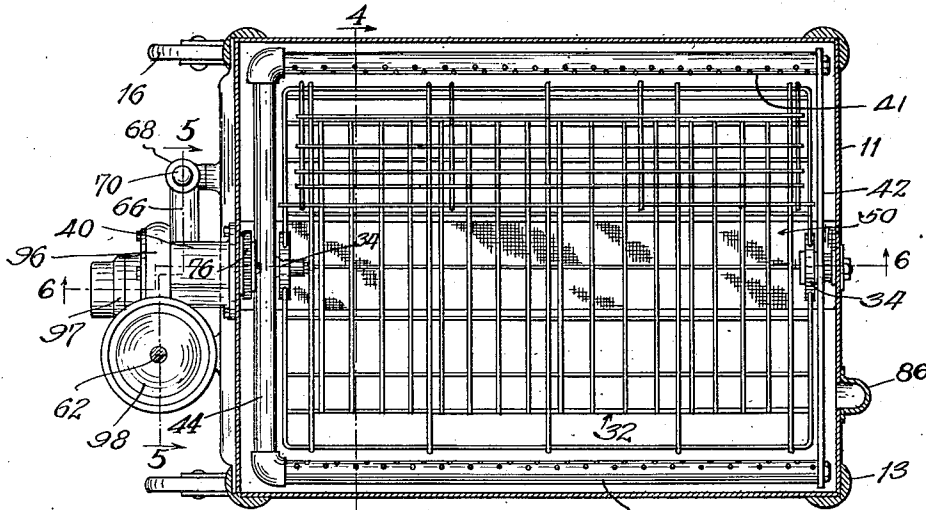


Fig. 3

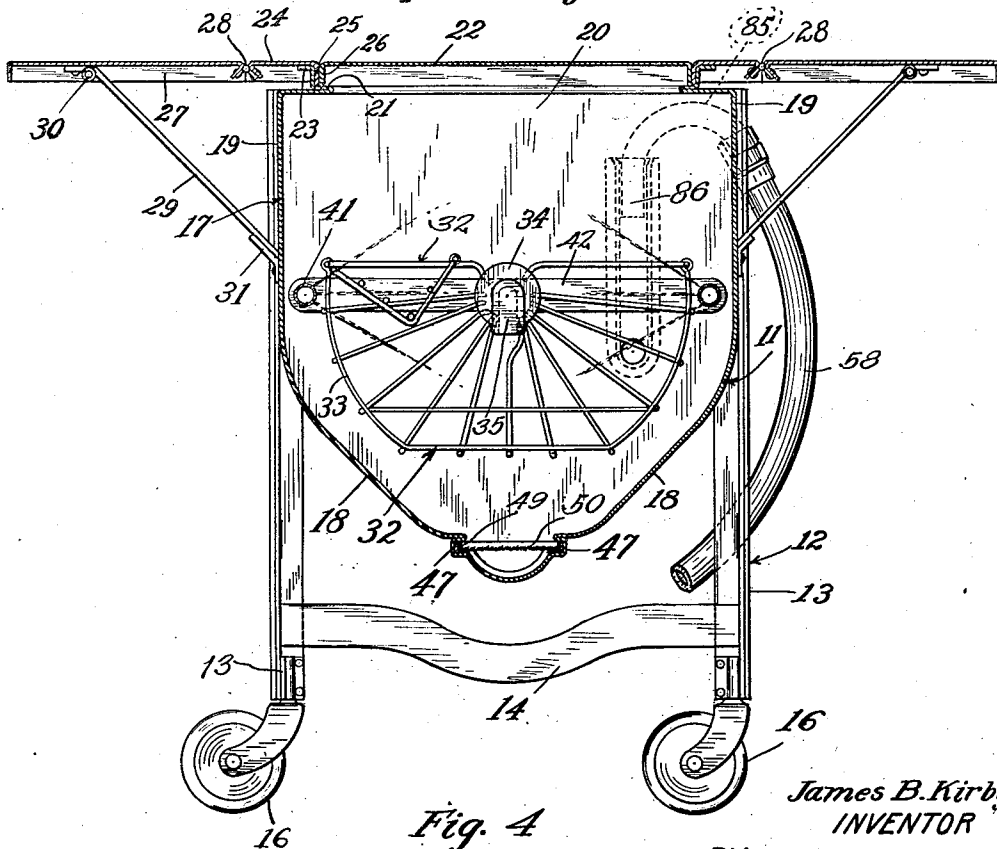


Fig. 4

James B. Kirby  
INVENTOR  
BY Smith and Freeman  
ATTORNEYS

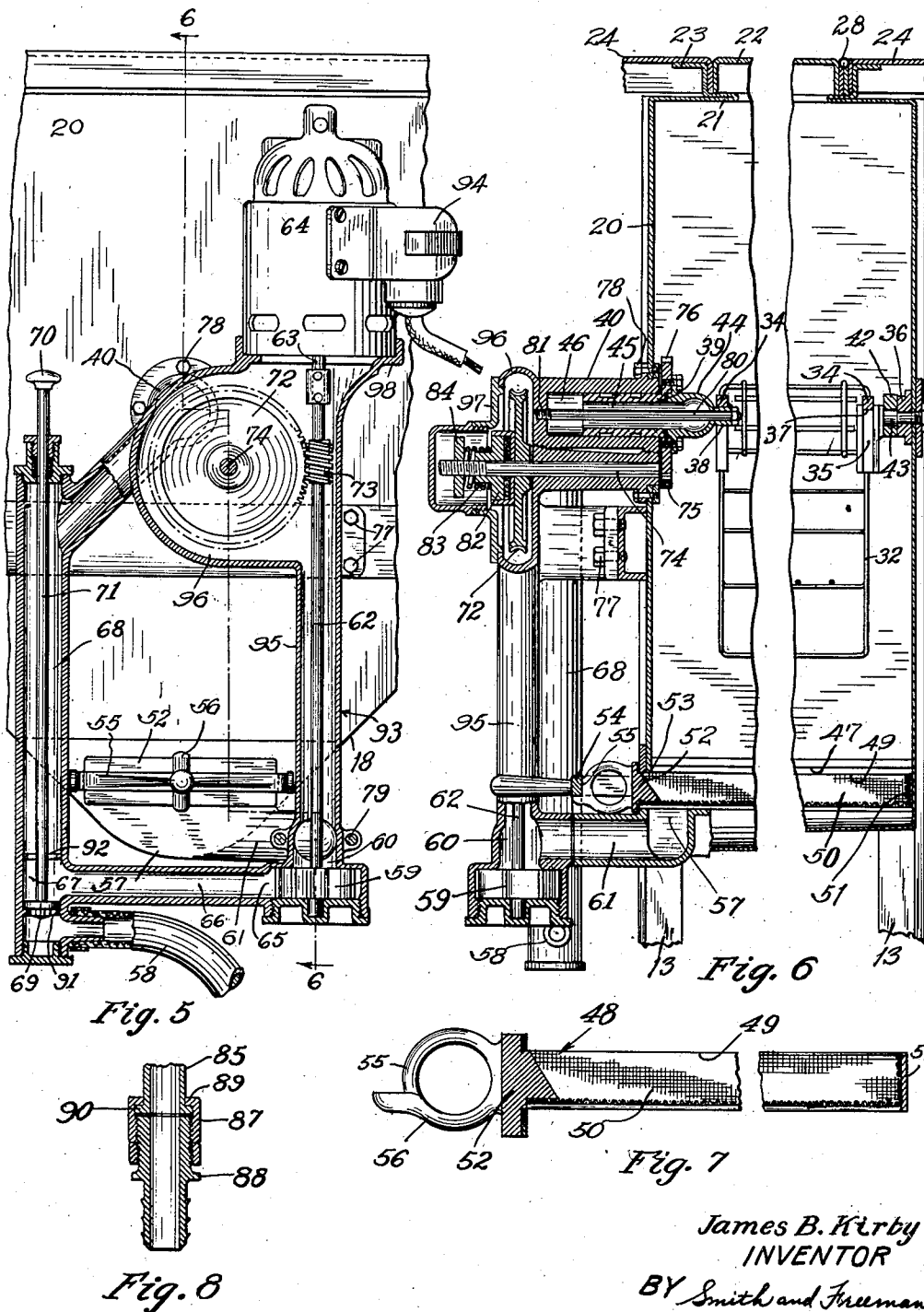
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**DISHWASHING MACHINE**

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## UNITED STATES PATENT OFFICE

1,927,665

## DISHWASHING MACHINE

James B. Kirby, West Richfield, Ohio, assignor  
to Industrial Improvements Incorporated,  
Cleveland, Ohio, a corporation of Ohio

Application November 19, 1926, Serial No.  
149,293. Renewed April 7, 1933

15 Claims. (Cl. 141-9)

My invention relates primarily to dishwashing machines, and particularly to dishwashing machines of the type designed for domestic use, although many features of the same are equally applicable to clothes-washing and other hydraulic machines. The main objects of the invention are the provision of new and improved mechanism for controlling, transferring and directing the liquid, and for producing the necessary mechanical movements employed in this type of machine; the provision of a new and improved mounting and disposition of pump and motor; the provision of operating-mechanism constructed as a unit and attachable and detachable as a whole to the remainder of the mechanism; the provision of a new arrangement of motor pump and driving-mechanism; the provision of new and improved arrangements for evacuating and draining the machine; while further objects and advantages of the invention will become apparent as the description proceeds. In the drawings accompanying this specification and forming a part of this application I have shown, for purposes of illustration, one form which my invention may assume. In these drawings:

Figure 1 is a perspective view of the embodiment of my invention illustrated herein.

Figure 2 is a perspective view of the basket employed with this embodiment of my invention for supporting the dishes to be washed.

Figure 3 is a horizontal sectional view through the embodiment of my invention herein shown taken just below the cover.

Figure 4 is a transverse vertical sectional view taken on the line 4-4 of Figure 3.

Figure 5 is a transverse vertical sectional view through the operating mechanism taken generally on the line 5-5 of Figure 3.

Figure 6 is a longitudinal vertical sectional view taken generally on the lines 6-6 of Figure 3 and Figure 5.

Figure 7 is an enlarged sectional view taken through the filtering tray, while

Figure 8 is an enlarged sectional view showing the details of the hose terminal connection.

The embodiment of my invention herein shown comprises a tub or casing 11 mounted in a carriage 12 comprising four legs 13 to which the tub or casing 11 is firmly secured, end cross members 14 extending between and bracing the legs 13 at each end of the carriage 12, side cross members 15 extending between and bracing the legs 13 at each side of the carriage 12, and rollers 16 positioned on the lower ends of the legs 13

provided to facilitate movement of the dishwashing machine from place to place.

In the embodiment of my invention herein shown the tub 11 comprises a sheet metal section 17 provided with upwardly and outwardly extending portions 18 forming the bottom of the tub 11, and with vertical portions 19 rising from the upper edges of the bottom forming portions 18 and forming the sides of the tub 11; sheet metal end members 20 closing the ends of the trough so formed; extensions of the side walls 19 and end walls 20 bent to form an inner flange 21 adapted to support a cover 22 closing the top of the tub 11, and an outer flange 23 adapted to support an annular top section 24 resting directly on the outer flange 23, provided with a depending rim 25 arranged to be inserted between the vertical portion of the outer flange 23 and the depending flange 26 of the cover 22, and carrying along its lateral edges top extensions 27 hinged to the annular cover section 24 by means of suitable hinges 28, and releasably secured in raised position by means of struts 29 pivoted at 30 to the extensions 27 and engaging at their lower ends in recesses formed by cleats 31, secured to the side walls 19 of the tub 11, the cover 22 and annular top section 24 and top extensions 27 being all finished in a style suitable for a dining table.

Mounted within the tub 11 is a basket 32 provided for supporting the articles to be washed and formed from a plurality of wire members 33 carried by two hubs 34 positioned at the two ends of the basket 32 and arranged to support the basket 32 from the end walls 20 of the tub 11 by engagement one with an extension 35 projecting from a stud 36 fixed to one end wall 20 of the tub 11 and elongated to cooperate with the elongated slot 37 of that hub 34 to prevent rotation of the basket 32, and the other by engagement with an extension 38 projecting from the hollow member 39 here shown as rotatably mounted in a bearing 40 carried by the other end wall 20 of the tub 11.

Also mounted within the tub 11 is an emitting means provided for discharging washing fluid upon the articles to be washed and herein shown as comprising a pipe 44 carried by the hollow member 39 and swinging in the space between the basket and the end wall of the casing, and also comprising longitudinal perforated pipes 41 projecting from and carried by the pipe 44 and movable in an orbit about the basket. The bore 45 of the member 39 communicates with a chamber 46 formed in the bearing 40, and the

far end of the pipe or pipes 41 are steadied by a cross bar 42 pivoted on the exterior of the stud 36.

In the embodiment of my invention herein shown the bottom portions 18 of the tub 11 are provided with channels 47 formed by bending the bottom portions 18 and arranged to slidably support a screen unit 48 herein shown as comprising side members 49 slidably engaging within the channels 47 carrying a screen bottom 50, secured together at their rear ends by a cross member 51, and secured together at their forward ends by a cross member 52 normally closing an aperture 53 through which the screen unit 48 may be withdrawn, and removably held in position closing the opening 53 by means of a latch 54 engaging a suitable cam surface 55 on the screen handle 56; and the means for removing fluid from the tub 11 comprises an outlet duct 61 communicating with a sump or trough 57 with which the base of the tub 11 is formed below the screen unit 48 and therefore in position to receive the fluid of the tub 11 only after the solid matter has been removed therefrom by the screen unit 48. This screen is substantially horizontal and of considerable area to prevent clogging, the screen-bottom being spaced sufficiently below the tops of the side members to afford room for the collection of waste, and the sides of the tub have sloping ledges which overlap the sides of the screen so as to deliver all such waste material onto the screen.

My invention also provides means for moving the tubes 41 orbitally about the basket 32 to cause the washing fluid to impinge on the dishes from all directions, and means for pumping the washing fluid from the outlet duct 61 either back through the tubes 41 or out through a discharge duct 58. In the embodiment of my invention herein shown the pump 59 is of the centrifugal type having its inlet 60 connected by means of a duct 61 to the sump 57 of the tub 11, operated by means of a vertical shaft 62 directly connected to the armature shaft 63 of an electric motor 64, and having its outlet 65 connected by means of a duct 66 to a valve chamber 67 opening on one side through a port 91 into the discharge duct 58, and opening on the other side through a port 92 into a pressure duct 68 leading to the chamber 46 of the bearing 40 to thus connect the outlet 65 of the pump 59 through the aperture 45 of the movable member 39 to the cross duct 44 and the tubes 41. The flow of the fluid from the valve chamber 67 through the ports 91 and 92 is controlled by a valve disc 69 operable from a handle 70 through a stem 71 into a lower position closing the port 91 and connecting the outlet 65 of the pump 59 to the pressure duct 68, or an upper position closing the port 92 and connecting the outlet 65 to the discharge duct 58, or to an intermediate position opening both ports 91 and 92 to drain everything into the discharge duct 58. Rotation of the tubes is effected by a gear 72 operated by a worm 73 carried by the pump shaft 62 and operating a shaft 74 extending into the tub 11 and carrying on its inner end a pinion 75 meshing with a gear 76 secured to the rotating member 39 and therefore effective to rotate said member 39 and cross duct 44, and with them, to rotate the tubes 41 about the basket 32.

The pump inlet 60 is extended vertically upward in the form of a hollow sleeve 95 which

rises sufficiently above water level to avoid the necessity for any packing gland. The upper end of this sleeve is enlarged at one side to form a casing 96 for the gear 72 and its friction gland, the face of said casing being closed by a movable cover 97. This brings the casing 96 closely adjacent to the bearing 40 and I preferably, therefore, cast the two integral one with the other; indeed I find it preferable to provide a single unitary frame for the entire operating mechanism, this frame in the present embodiment comprising two upright hollow members 68 and 95, the bearing 40 and gear case 96, the pump chamber and its outlet pipe 66, the valve chamber 67 and the motor seat 98. Obviously this frame could be made in a great many forms but in the present embodiment it defines substantially an open rectangle surrounding the garbage drawer cross member 52 and is secured in place by the bolts 77, 78, and 79, the last named serving to connect the pump inlet 60 to the duct 61. The trunnion 39 is inserted into the bearing 40 after the latter has been secured to the tub wall and is secured in position by means of a bolt 80 extending through the rotatable member 39 into a cooperatively screw-threaded aperture 81 in the remote end of the bearing 40; and I drive the shaft 74 rotating the tubes 41 through an impositive connection herein shown as comprising a friction member 82 splined to the shaft 74 and urged into frictional engagement with the gear 72 by means of a spring 83 compressed between the friction member 82 and an adjustable abutment 84 carried by the end of the shaft 74.

While the discharge duct employed with the embodiment of my invention herein shown may be of any suitable construction I prefer to provide this discharge duct with a U-shaped rigid terminal 85 adapted to hook over the edge of a sink or tub, or over the rim of a hollow inlet member 86 communicating with the interior of the tub 11 to return into the tub 11 any fluid inadvertently flowing into the discharge duct 58, and to form this terminal 85 to hook over at any angle by connecting this terminal 85 to the remainder of the discharge duct 58 by means of a swivel connection more particularly shown in figure 8 and comprising a sleeve 87 screw-threadedly united to a plug 88 unitary with the body of the discharge duct 58, and swivelly connected to the terminal 85 by means of an inwardly extending flange 89 overlying an outwardly extending flange 90 carried by the terminal 85.

The operation of the motor 64 may be controlled by a suitable electric switch 94.

From the foregoing description it will be obvious to those skilled in the art that I have provided a dishwashing machine wherein washing and rinsing operations can be performed with a minimum amount of fluid, wherein the table refuse is removed without the necessity of independently scraping the dishes and without clogging the mechanism, wherein the screen unit is so coordinated with the tub as to practically prevent use of the tub with the screen unit removed, wherein the washing fluid is impinged against the dishes from all directions, wherein the pump returning the washing fluid to the emitting means may also be employed to discharge the washing fluid from the tub, wherein the discharge duct is formed to facilitate removable securing thereof to a receiver for the discharge washing fluid, wherein the entire operating

mechanism is driven by a single motor, and carried in a single frame readily removable from the tub as a unit, and wherein no packing is required about the pump operating shaft, or about the driving shaft which extends through the liquid.

At the same time it will also be obvious to those skilled in the art that the embodiment of my invention herein shown and described comprises advantages other than those specifically pointed out or suggested herein, and also that the particular embodiment of my invention herein shown and described may be variously changed and modified without departing from the spirit of my invention or sacrificing the advantages thereof, and it will therefore be understood that the disclosure herein is illustrative only, and that my invention is not limited thereto.

I claim:

1. A dishwashing machine comprising a tub formed in its lower part with spaced, sloping-top ledges and a sump below said ledges, a frame having side walls movably positioned beneath said ledges and a screen bottom spaced a sufficient distance below said ledges to afford room for waste, the tub wall having an aperture level with said frame for the horizontal removal and replacement of said frame, said screen bottom dividing said sump from the upper portion of said tub, supporting means located in said upper portion for supporting the dishes to be washed, a pump having its inlet communicating with said sump, and emitting means located in said tub, above said screen, in position to impinge washing fluid against such dishes, said emitting means communicating with the pump outlet.

2. A washing machine comprising a tub provided with an outlet in the lower portion thereof, supporting means disposed inside the tub for supporting the articles to be washed, emitting means supported in position to impinge washing fluid against such articles, a centrifugal pump located at a lower level than said outlet and having its shaft vertical, the inlet of said pump connected to said outlet and the outlet of said pump connected to said emitting means, a sleeve joined to the upper face of the pump casing and loosely surrounding the pump shaft to a height above the liquid level, and an electric motor operatively connected to said shaft above said sleeve said pump and motor being located outside of said tub.

3. A washing machine comprising a tub provided with an outlet in the lower portion thereof, supporting means disposed inside said tub for supporting the articles to be washed, emitting means supported to impinge washing fluid against such articles, a centrifugal pump located at a lower level than said outlet and having its axis vertical, the inlet of said pump connected to said outlet and the outlet of said pump connected to said emitting means, a vertical drive shaft for said pump, and a sleeve joined to the upper face of the pump casing and loosely surrounding said shaft to a height above the liquid level, said pump and sleeve being located outside of said tub.

4. A dishwashing machine comprising a casing provided with an outlet in the lower portion thereof, a dish-receiving basket located in said casing between the upper and lower portion thereof, washing fluid emitting means located

inside said casing and movable relative to said dish basket, a centrifugal pump connected between said outlet and said emitting means and having a vertical shaft, an electric motor operatively connected to the upper end of said shaft, and operative connections from said motor for moving said emitting means, the casing of said pump having a vertical sleeve loosely surrounding the pump-shaft and said first casing having in its wall an opening located at a lower level than the top of said sleeve, said opening establishing a maximum level for the liquid within said casing.

5. A washing machine comprising a tub provided with an outlet in the lower portion thereof, washing fluid emitting means disposed within said tub, a circulating pump for pumping such fluid from said outlet through said emitting means, said pump comprising an impeller and a casing surrounding said impeller provided with an inlet-opening and an outlet-opening and having a hollow sleeve rising above the normal level of such fluid within said tub, duct means connecting said tub outlet to said inlet-opening and said outlet-opening to said emitting means, and a driving element for said impeller entering said casing through said sleeve, said pump casing and said duct means and said driving element being formed for assembly as a unit and located entirely outside of said tub.

6. In a washing machine a casing for the washing liquid and the articles to be washed, said casing having an outlet, a centrifugal pump located outside of said casing and mounted with its axis vertical and its inlet communicating with said outlet, the casing of said pump having an upright sleeve which rises outside said casing to a height above the liquid level, a drive shaft for said pump projecting loosely through said sleeve, and driving means for said shaft also located outside of said casing and above the liquid level.

7. In a washing machine a casing for the washing liquid and the articles to be washed, said casing having an outlet, a centrifugal pump located outside of said casing and mounted with its axis vertical and its inlet communicating with said outlet, the casing of said pump having an upright sleeve which rises outside said casing to a height above the liquid level, a drive shaft for said pump projecting loosely through said sleeve, and a vertical electric motor secured to the exterior of said casing and operatively connected to said shaft.

8. In a washing machine a casing having an outlet, a centrifugal pump located outside of said casing and having inlet and outlet ports, the pump-inlet communicating with the casing-outlet, a flexible hose having one end communicating with the pump-outlet and having a bent-over part secured to its free end by a swivel connection, and a valve located in controlling relation to one of said ports, said casing having an opening in its upper part adapted for the reception of said bent-over part.

9. In a washing machine, in combination, a casing having an opening in its lower part and a working opening in its upper part and also another opening in its upper part, liquid circulating mechanism comprising a pump and a valve, said mechanism having an inlet and an outlet, said inlet connected to said first opening, a discharge hose having one end connected to said last named outlet, and a hook shaped nozzle carried by the free end of said hose

adapted either to be loosely inserted in said other opening or to be applied to the rim of a waste liquid receptacle in supported and liquid delivering relation.

- 5 10. In a washing machine, a shaft, a pump chamber in line therewith, a rotor in said chamber connected to said shaft, a driving element connected to the other end of said shaft, a driving gear carried by said shaft between said rotor and element, and mechanical devices constituting a part of said washing machine operatively connected to said gear, the casing of said pump having an inlet coaxial with said rotor and an outlet at one edge of the rotor and a removable part at one side of said rotor.

- 15 11. In a washing machine, a casing having a working opening in its top and a liquid outlet in its bottom, a cover for said opening, a pump having its inlet communicating with said outlet, a discharge hose carried by the machine and adapted to receive the liquid discharged by said pump, and a hooked nozzle carried by the free end of the hose and secured thereto by a swivel connection whereby said nozzle is movable about an axis longitudinal of the hose, said nozzle being adapted to be applied to the rim of a sink or tub and said casing having an opening additional to said first named opening and out of the way of said cover adapted to receive the end of said nozzle to support said hose.

- 20 12. Liquid handling devices for domestic washing machines comprising a casing, a drain valve, a centrifugal pump, and a flexible discharge hose connected together in series, said hose having at its free end a bent-over part adapted to be hooked over a receptacle rim in supported and liquid-delivering relation, said casing also having in its upper part an opening of a size in which the extremity of said bent-over part is adapted to fit.

- 25 13. In a washing machine a casing having an outlet, a centrifugal pump located outside of said casing and having inlet and outlet ports, the pump-inlet communicating with the casing-outlet, a flexible hose having one end communi-

cating with the pump-outlet and having a bent-over part at its free end, and a valve located in controlling relation to one of said ports, said casing having an opening in its upper part adapted for the reception of said bent-over part.

- 30 14. In a washing machine, in combination, a supporting structure, liquid holding means carried by said structure and having a drain opening in communication with the bottom thereof, said means comprising a removable cover for a working opening formed in the top thereof, liquid circulating mechanism comprising a pump and a valve, said mechanism having an inlet and an outlet with the inlet thereof connected to the drain opening of said means, a discharge hose having one end connected to the outlet of said liquid circulating mechanism, a hook shaped nozzle carried by the free end of said hose and adapted to be applied to the rim of a waste liquid receptacle in supported and liquid delivering relation, and means opening into the upper part of said liquid holding means adapted for receiving and supporting said nozzle whereby liquid may be pumped from the lower to the upper part of said liquid holding means.

- 35 15. In a washing machine, in combination, a supporting structure, liquid holding means carried by said structure, said liquid holding means having a working opening in the top thereof and a drain opening in communication with the bottom thereof, a removable cover for said working opening, a liquid circulating pump having an inlet and an outlet with the inlet thereof connected to said drain opening, a discharge hose having one end connected to the outlet of said pump, a hook shaped nozzle carried by the free end of said hose and adapted to be applied to the rim of a waste liquid receptacle in supported and liquid delivering relation, and means opening into the upper part of said liquid holding means adapted for receiving and supporting said nozzle whereby liquid may be pumped from the lower to the upper part of said liquid holding means.

JAMES B. KIRBY.

## DISCLAIMER

1,927,665.—James B. Kirby, West Richfield, Ohio. DISHWASHING MACHINE. Patent dated September 19, 1933. Disclaimer filed February 2, 1939, by the assignee, *Industrial Improvements Incorporated*, and the trustee, *The Apex Electrical Manufacturing Company*.

Hereby disclaim claims 8 and 13 from the specification of said patent. [Official Gazette February 21, 1939.]