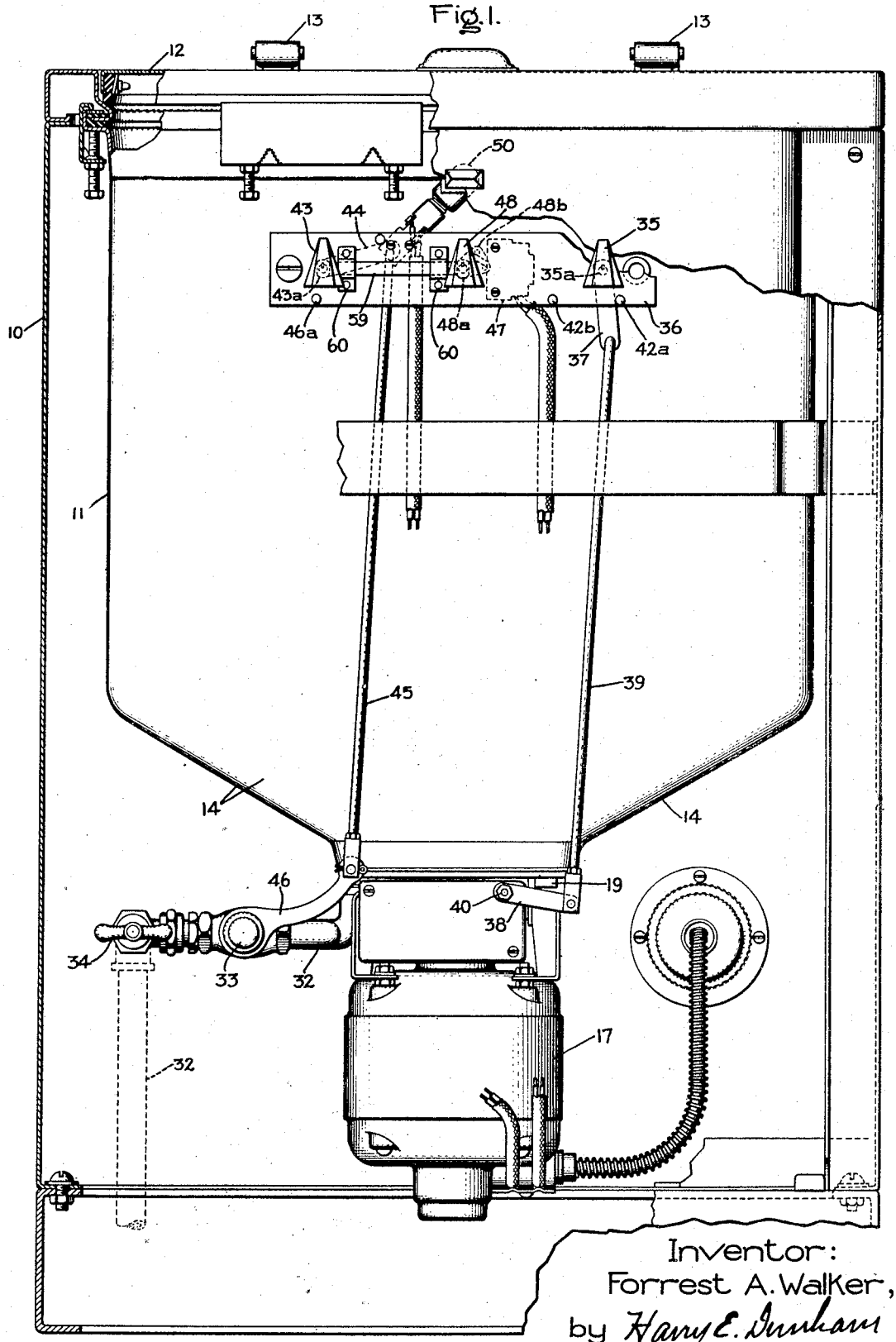
Jan. 3, 1939. F. A. WALKER 2,142,928

WASHING APPARATUS

Original Filed May 3, 1935 3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

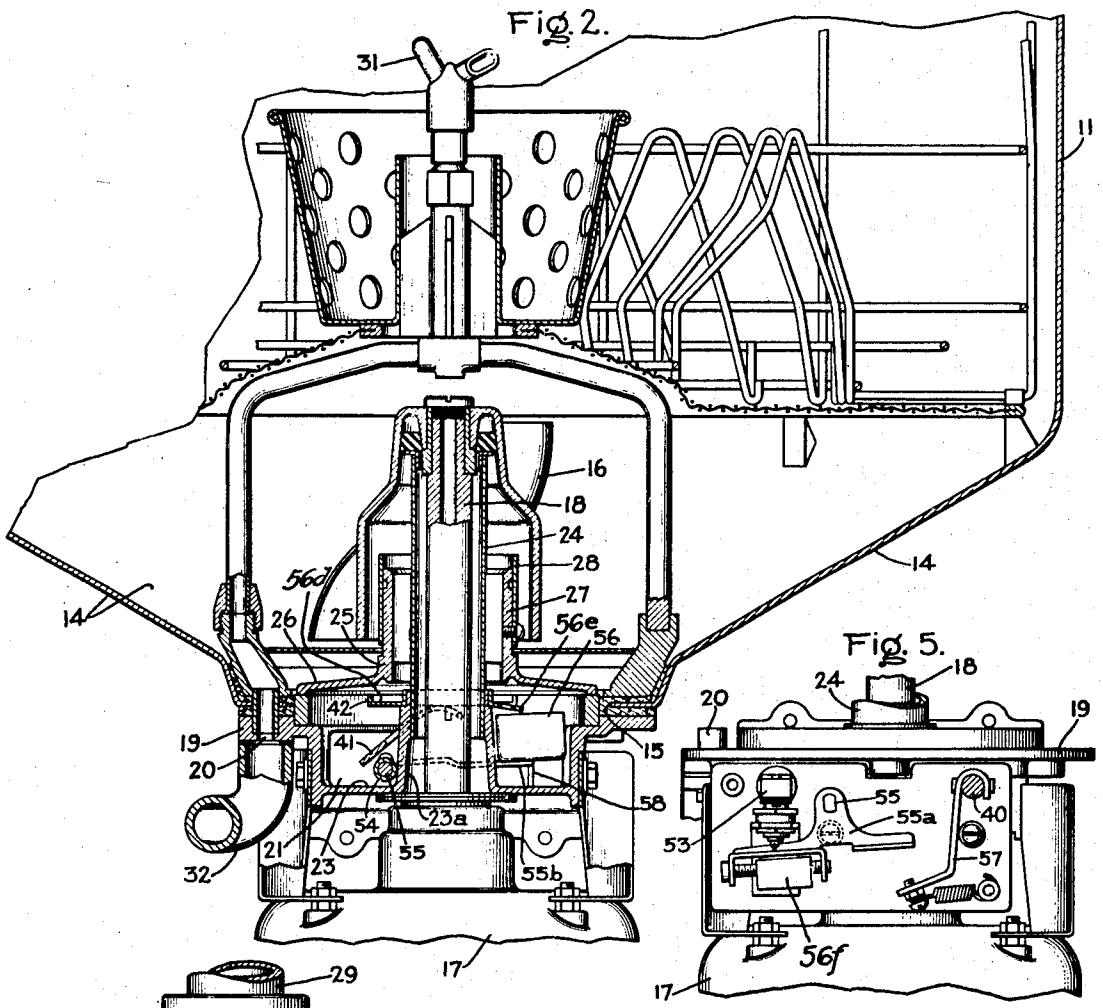


Fig. 5.

Fig. 3.

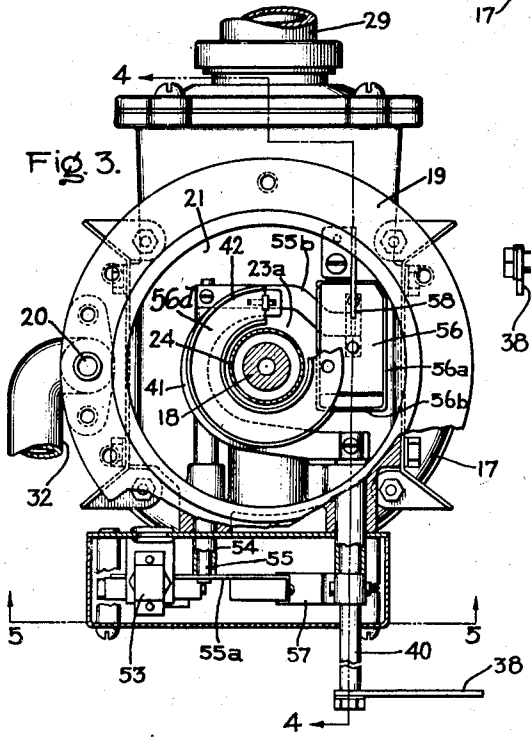
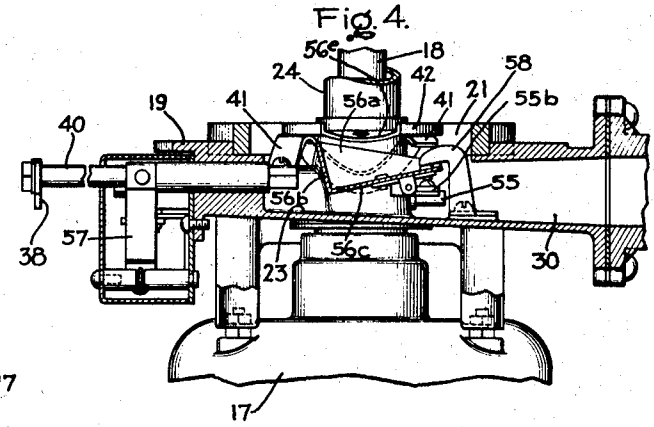


Fig. 4.



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WASHING APPARATUS

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Fig. 6.

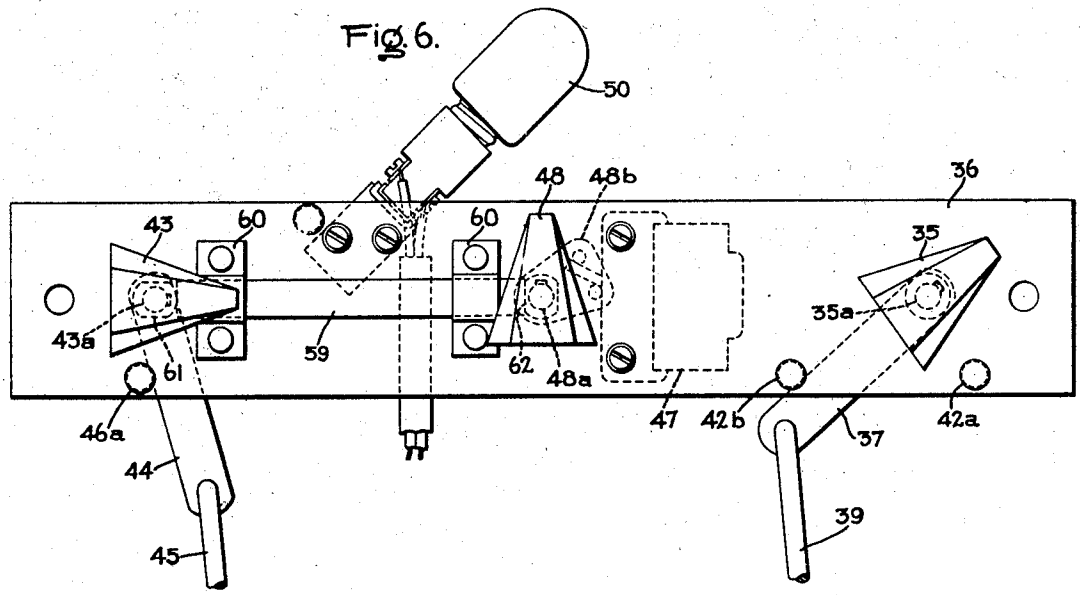
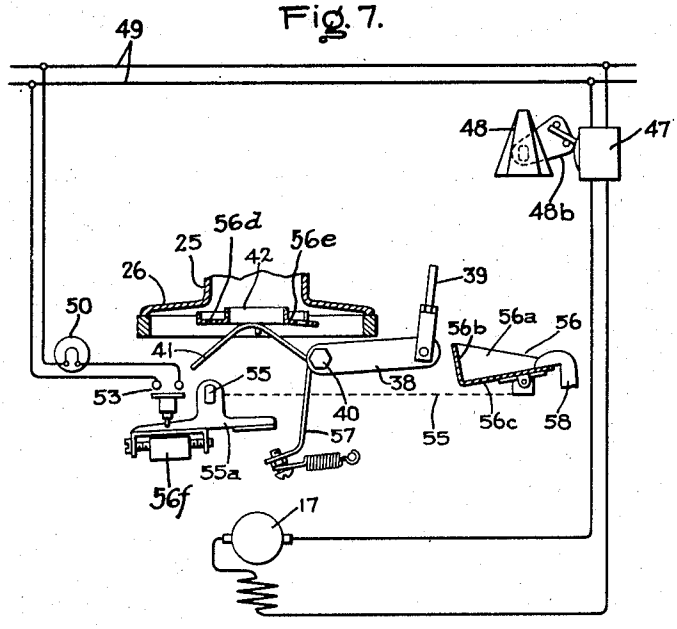


Fig. 7.



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UNITED STATES PATENT OFFICE

2,142,928

WASHING APPARATUS

Forrest A. Walker, Oak Park, Ill., assignor, by mesne assignments, to Edison General Electric Appliance Company, Inc., a corporation of New York

Original application May 3, 1935, Serial No. 19,637. Divided and this application June 19, 1936, Serial No. 86,110

5 Claims. (Cl. 141—9)

This invention relates to washing apparatus, more particularly to dishwashing apparatus, and it has for its object the provision of improved apparatus of this character.

While not limited thereto, the invention has particular application to dishwashing apparatus wherein a cleansing liquid, such as water, is circulated in the washing vat through dish-supporting racks by suitable power driven means, such as a motor driven impeller.

This application is a division of my copending application, Serial No. 19,637, filed May 3, 1935, and assigned to the same assignee as this application.

In this copending application, there is described and claimed a signal system for indicating to the attendant when a predetermined quantity of washing liquid has been supplied to the washing vat. As there described, a suitable signal device is controlled to give an indication by the flow of liquid through a suitable maximum liquid level overflow. In other words, when a maximum free liquid level has been established in the vat, that is, when a predetermined quantity of liquid has been supplied to the vat, the liquid which flows out of the overflow operates to cause the signal device to give an indication.

If when the liquid is being supplied to the vat, the liquid circulating impeller be operating it is impossible to establish a free liquid level in the vat and hence, it is not possible to obtain a correct measure of the quantity of liquid that has been supplied. It is an object of this invention to provide suitable interlocking means between the liquid supply means and the impeller so that when the former is operated to admit liquid to the vat, the impeller cannot be operated. Conversely, when the impeller is operating it is not possible to admit liquid to the vat.

For a more complete understanding of this invention, reference should be had to the accompanying drawings, in which Fig. 1 is a vertical elevation of dishwashing apparatus embodying this invention, portions being shown in section and parts being broken away so as to illustrate certain details of construction; Fig. 2 is a fragmentary sectional view of a portion of the apparatus shown in Fig. 1; Fig. 3 is a fragmentary plan view of a portion of the apparatus shown in Fig. 2 parts being broken away and parts being shown in section so as to illustrate certain details of construction; Fig. 4 is a sectional view taken through the line 4—4 of Fig. 3 and looking in the direction of the arrows; Fig. 5 is a sectional view taken through the line 5—5 of Fig. 3 and looking in the direction of the arrows; Fig. 6 is an elevation illustrating a portion of the apparatus shown in Fig. 1; and Fig. 7 is a diagrammatic view illustrating a signal device used in the washing apparatus of Figs. 1 to 6, together with controlling mechanism therefor.

Referring more particularly to Figs. 1 to 5 inclusive, this invention has been shown in one form as applied to dishwashing apparatus as described and claimed in my above-mentioned copending application. This apparatus comprises a casing or cabinet 10 enclosing a suitable washing vat or chamber 11, which is supported at its upper end from the casing. The vat 11 is provided with a suitable cover 12 which may be elevated on hinges 13 whereby access can be had to the interior of the vat.

The bottom wall of the vat 11, as shown, is provided with a plurality (four) of inclined portions 14 which slope downwardly toward the center of the bottom of the vat and terminate in an opening 15 arranged centrally of the vat.

In the lower portion of the vat 11 above the opening 15 is a suitable impeller 16 arranged to rotate on an axis substantially coaxial with the central vertical axis of the vat and the opening 15. The impeller 16 is operated by means of an electric motor 17 mounted below the bottom wall of the vat and having its shaft 18 extending through the opening 15 and operably connected with the impeller. The motor 17 is supported by a metallic frame 19, which is mounted below the bottom wall of the vat, as shown in Figs. 1 and 2.

The frame 19, in addition to serving as a support for the motor 17 also functions to convey fresh cleansing water to the vat 11, and further, to conduct soiled water from the vat to a suitable drain. The frame 19, as shown, is provided with an inlet or fresh cleansing fluid supply conduit 20, and further, with an internal chamber 21 constituting a drain chamber.

The bottom 23 of the drain chamber is provided with a reentrant portion 23a which surrounds the motor shaft 18, and which supports in an upright position a tubular member 24 arranged about the shaft and in spaced relation with it. Surrounding the sleeve 24 is a valve 25 provided with a closure portion 26 which controls communication between the vat and the drain chamber 21, and an upright tubular portion 27 arranged in spaced relation with the tube 24. The space between the tubular member 24 and the tubular valve portion 27 constitutes an overflow for the vat. A vertically adjustable sleeve 28 is mounted on the tubular portion 27 of the valve to control the maximum free liquid level permitted in the vat.

The drain chamber 21 communicates with a drain conduit 29 through a lateral port 30 (Fig. 4).

The supply passageway 20 communicates with the vat 11 through a suitable reaction spray device 31, as described in my above-mentioned copending application.

A suitable supply conduit 32 connected with a suitable source of cleansing liquid supply, such

as a hot water tank (not shown), is connected with the supply passageway 20; the supply of water to the vat is controlled by means of a suitable valve 33. A second control valve 34 is provided but this normally will be in its open position, the control of the liquid to the vat normally being controlled solely by the valve 33.

The drain valve 25 is operated by means of a suitable control knob 35 which is supported on a panel 36 that in turn is secured to the vat 11. The control knob 35 operates a shaft 35a which is connected to operate a lever 37. The lever 37 is connected to operate a lever 38 by means of a link 39. The lever 38 operates a shaft 40 (Figs. 1, 3 and 4). The shaft 40 extends into drain chamber 21 where it operates a U-shaped lever 41 (Figs. 2, 3 and 4). The U-shaped lever 41 is secured to a ring-shaped collar 42 which surrounds the tubular member 24. The collar 42 when elevated is arranged to engage the drain valve 25 to elevate it and thereby permit the vat to drain. It will be observed that if the knob 35 be rotated in a clockwise direction, as viewed in Fig. 1, from its position of Fig. 1 to its position of Fig. 6 it will move the lever 38 in a counter-clockwise direction. This operation of the lever 38 will move the lever 41 in a counter-clockwise direction which will lower the collar 42 to permit the drain valve to close by gravity. When the knob 35 is returned to its position shown in Fig. 1, the drain valve 25 is moved to its open position and is held in this position by the lever 37 which moves through a central position and contacts a stop 42a carried by panel 36. A similar stop 42b is provided on the panel for limiting movement of lever 37 in a clockwise direction.

The liquid supply valve 33 is controlled by means of a knob 43 similar to the knob 35. The knob 43 is connected to operate a shaft 43a which operates a lever 44. The lever 44 is connected to a link 45 which connects the lever 44 with a lever 46. The lever 46 in turn is connected to the valve 33 to operate it. When the knob 43 is rotated in a clockwise direction from its position shown in Fig. 1 to its position shown in Fig. 6, the liquid supply valve will be opened, whereas when it is returned to the position of Fig. 1, the liquid supply valve will be closed. A stop 46a is provided on a panel 36 for the link 44 in its position of Fig. 6.

The energization of the impeller motor 17 is controlled by means of a switch 47, the operation of which is controlled by means of a knob 48 that is similar to the knobs 35 and 43. The knob 48 operates a shaft 48a which in turn operates a switch operating lever 48b. The lever operates the switch 47 between its open and closed positions. The switch is shown diagrammatically in Fig. 7. As there shown, the impeller motor 17 is provided with a suitable source of electrical supply 49 and is connected with the supply source through the controlling switch 47. When the knob 48 is rotated in a clockwise direction from its position shown in Fig. 1, it will operate the switch to energize the impeller motor, whereas when the knob is returned to the position shown in Fig. 1, it will deenergize the impeller motor.

As pointed out previously, the drain valve 25 determines the maximum free liquid level that can be obtained in the vat when the drain valve is closed. In other words, the drain valve constitutes an overflow which determines the maximum quantity of water which is permitted to accumulate in the vat. It is contemplated that the collar 28 will be so adjusted that when the maximum free liquid level rises to the point of overflow, the proper quantity of water will have been supplied to the vat for a washing operation.

As described in my above copending application, one form of my signalling means for indicating when the maximum level has been supplied comprises a suitable incandescent lamp 50. As shown diagrammatically in Fig. 7, the incandescent lamp 50 is also energized from the supply source 49. The energization of the lamp is controlled by means of a switch 53. The switch 53 in turn is controlled by means of a lever 54 comprising a shaft 55, the lever arm 55a mounted upon the shaft and supporting the movable contact of the switch 53, and further, a lever arm 55b arranged within the drain chamber 21, as shown in Figs. 2, 3 and 4. The lever arm 55b supports a suitable spoon 56. The spoon 56, as shown, is pivotally supported upon the lever arm 55b. The spoon is provided with a pair of triangular shaped sides 56a which have their left-hand ends, as viewed in Figs. 4 and 7 joined together by a rear wall 56b and which at their front taper downwardly to merge with the bottom wall 56c of the spoon. Normally, the spoon occupies the position it has in these figures.

As described in detail in my above copending application, the spoon 56 is located in the drain chamber 21 so as to engage the fluid which overflows the drain valve to operate the switch 53 to energize the lamp 50. Thus, when the liquid supply valve 33 is opened to permit liquid to flow into the vat and the free liquid level rises to the point of overflow and the liquid does over-flow the drain valve, the water directed into the spoon 56 will collect therein and will operate the lever arm 55a to cause the switch to close.

Preferably, and as shown, the collar 42 will be provided with an annular channel 56d having a discharge lip 56e arranged so that liquid overflowing the drain valve drains into channel 56d and from the channel flows through the lip 56e directly into the spoon 56.

The spoon is counterbalanced by means of a weight 56f adjustably mounted on the lever arm 55a. The weight is adjusted so that when the spoon is empty, the lever arm will be held in its switch opening position.

The spoon 56, however, when filled will hold the switch 53 closed while the machine is operating and until the drain valve 25 is operated to its open position. When the drain valve is operated to its open position, it operates an arm or lever 57 secured to the valve shaft 40 to engage the lever arm 55a so as to move the switch 53 to its open position. When the lever arm 55a is thus operated, it elevates the spoon so that its forward end engages a stop 58. This tilts the spoon to empty its contents directly into the drain chamber, and permits the weight 56f to move the spoon to its switch open position shown in Figs. 4 and 7.

As pointed out previously, it is necessary that the impeller motor be deenergized while liquid is being supplied to the vat. In other words, it is necessary that there be a free liquid level in the vat while the vat is being supplied with liquid for the washing operation. If the impeller were operating during this operation, it would engage the liquid as it is supplied to the vat and hurl it upwardly and outwardly in the vat so that it would be impossible for the drain valve to function to measure a suitable quantity of water. In

order to prevent the energization of the impeller motor while the liquid supply valve is open, suitable interlocking means is provided between the control knobs **43** and **48** for the supply valve and motor respectively. This means comprises a suitable slide bar **59** mounted upon the panel **36** by means of a pair of clips **60**. Each of the shafts **43***a* and **48***a* is provided on its sides with flat portions **61** and **62** respectively. The bar **59** has such a length that it would be impossible for both of the knobs **43** and **48** to be in their operative positions. In other words, if the control knob **43** is moved to supply liquid to the vat, as shown in Fig. 6, the bar **59** will be moved to the right against the flat portion **62** of the shaft **48***a* so as to prevent movement of the knob **48** from its off position. Likewise, when the knob **48** has been moved to energize the motor after the proper quantity of fluid has been supplied to the vat, it will be impossible to turn the supply knob **43** from its off position.

This interlocking means positively prevents operation of the impeller when the valve **33** is opened to supply liquid to the vat. It thus insures functioning of the signal lamp to give an indication when the predetermined desired quantity of liquid has been supplied to the vat. Moreover, when the proper quantity has been supplied, and the impeller is operating, the interlock prevents operation of the liquid supply valve to admit any more liquid to the vat.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I, therefore, contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. Washing apparatus comprising a vat, a liquid supply valve controlling the admission of cleansing liquid to said vat, power-operated liquid circulating means for circulating liquid in said vat, a pair of control members for said valve and circulating means respectively, each manually operable between a pair of controlling positions, that for said valve when moved from its one to its other position opening said valve and when returned to said one position closing said valve, and that for said circulating means causing it to operate to circulate liquid in the vat when moved from one to the other position and causing it to cease operating when returned to said one position, and interlocking means between said pair of control members constructed and arranged so that they can be selectively operated manually from their said one to their other controlling positions either to open the valve to supply liquid to the vat or to operate the liquid circulating means, but when either control member has been so operated, the other member cannot be until that which has been operated is returned to its said one position, which operation releases said other member, whereby liquid cannot be circulated in said vat as long as liquid is being supplied to it, and liquid cannot be supplied as long as said circulating means is operating.

2. Dishwashing apparatus comprising a vat, liquid supply and drain conduits connected to said vat, liquid supply and drain valves controlling said conduits respectively, said drain valve constructed and arranged to provide for the overflow of liquid to said drain conduit when a predetermined maximum free liquid level is established in said vat, an impeller in said vat arranged to engage the liquid therein so as to circulate it in said vat, a motor for driving said impeller, a switch controlling said motor, a pair of knobs controlling the operation of said liquid supply valve and said switch respectively, and interlocking means between the knobs arranged so that when said knob controlling said liquid supply valve has been operated to supply liquid to said vat, said control knob for said switch cannot be operated to effect the operation of said motor to drive said impeller to circulate liquid in said vat until said liquid supply valve has been shut, thereby obviating disturbance of the free liquid level in said vat by said impeller while said liquid is being supplied to said vat.

3. Dishwashing apparatus comprising a vat, a liquid supply conduit connected with said vat, a liquid supply valve controlling said conduit, an overflow for said vat establishing the maximum free liquid level in said vat, a liquid circulating impeller in said vat, a control member for said supply valve, a second control member for said liquid circulating impeller, interlocking means between said control members arranged so that when said first control member has been operated to open said valve to supply liquid to said vat said second control member cannot be operated to effect the operation of said liquid circulating impeller until said first control member has been operated to shut off the liquid supply, thereby obviating disturbance of the free liquid level in said vat by said liquid circulating impeller while liquid is being supplied to said vat, a signal device, and means actuated by liquid flowing into said overflow after said liquid level has been established controlling said signal device to give an indication.

4. Dishwashing apparatus comprising a vat for receiving dishes to be cleansed and the cleansing liquid, an impeller in the lower portion of said vat in position to engage the liquid supplied to the vat to hurl it upwardly and outwardly in the vat, a motor for operating said impeller, a switch controlling said motor, a liquid supply valve for said vat, an overflow for said vat to establish the maximum free liquid level in said vat, and interlocking means between said valve and switch constructed and arranged so that said switch is locked in its position to deenergize said motor as long as said supply valve is open whereby liquid cannot be circulated in said vat while being supplied to the vat, and said valve cannot be opened to supply liquid to said vat while said impeller is operating so that no more than the desired maximum quantity of water established by said overflow can be circulated by said impeller.

5. Dishwashing apparatus comprising a vat for receiving dishes to be cleansed and the cleansing liquid, an impeller in the lower portion of said vat in position to engage the liquid supplied to the vat to hurl it upwardly and outwardly in the vat, a motor for operating said impeller, a switch controlling said motor, a liquid supply valve for said vat, an overflow for said vat to establish the maximum free liquid in said vat, control shafts for said switch and valve, each having a flattened section, and an interlocking bar between said flattened sections locking each shaft against movement when the other has been operated either to supply liquid to the vat or to energize said motor.

FORREST A. WALKER.

CERTIFICATE OF CORRECTION.

Patent No. 2,142,928. January 3, 1939.

FORREST A. WALKER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 67, claim 5, after the word "liquid" insert level; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of February, A. D. 1939.

Henry Van Arsdale.

(Seal) Acting Commissioner of Patents.