Aug. 20, 1935. G. ANDERSON 2,012,178

DISHWASHING MACHINE

Filed April 4, 1932 4 Sheets-Sheet 1

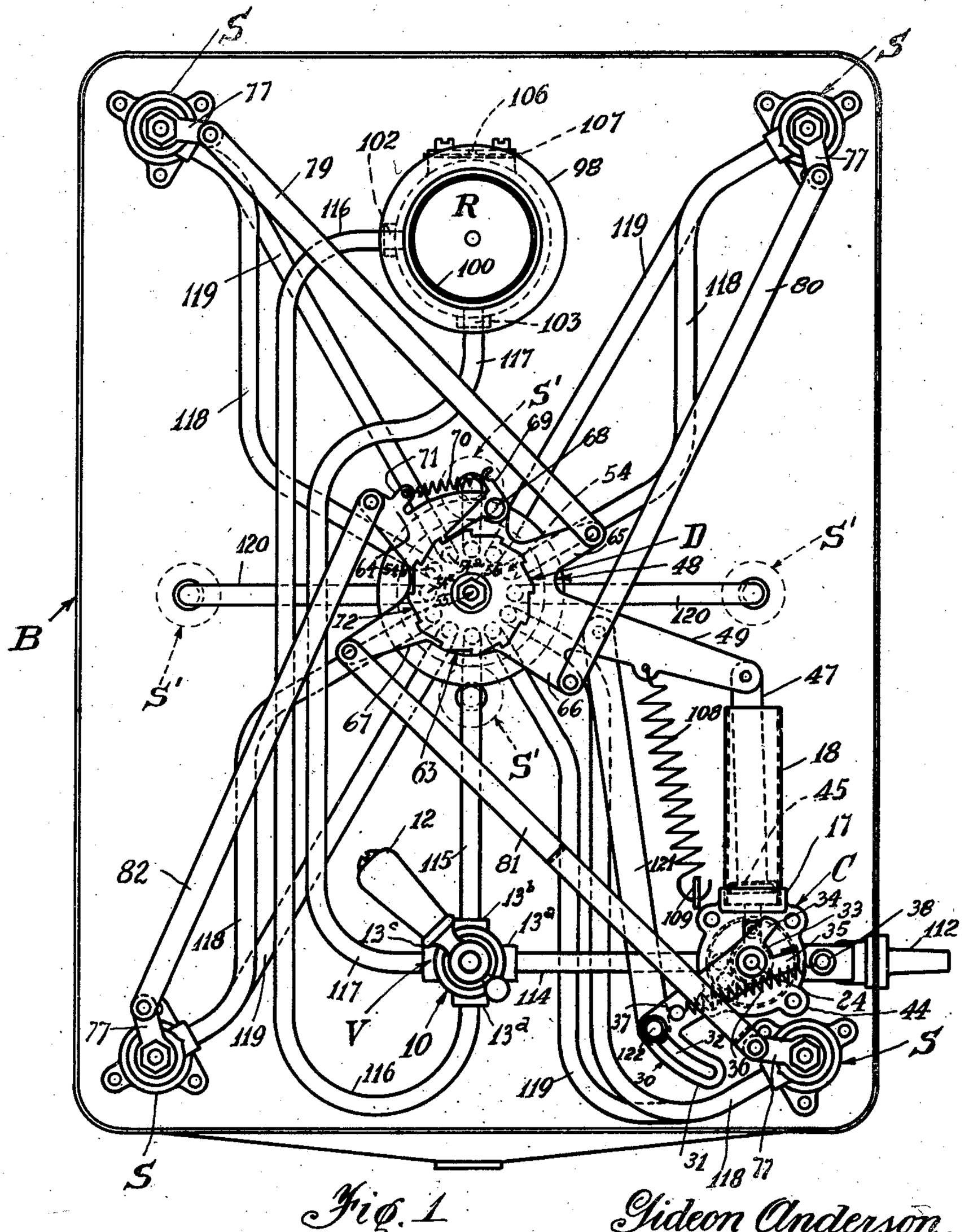

Fig. 1

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DISHWASHING MACHINE

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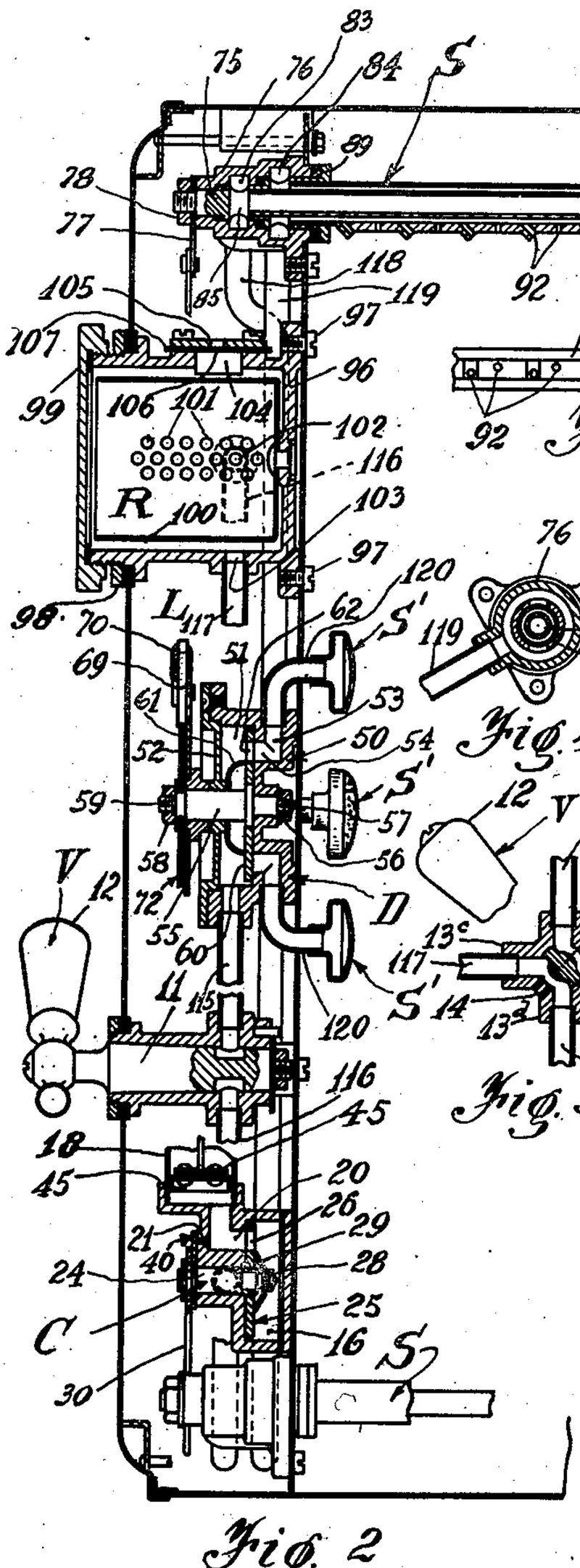

Fig. 2

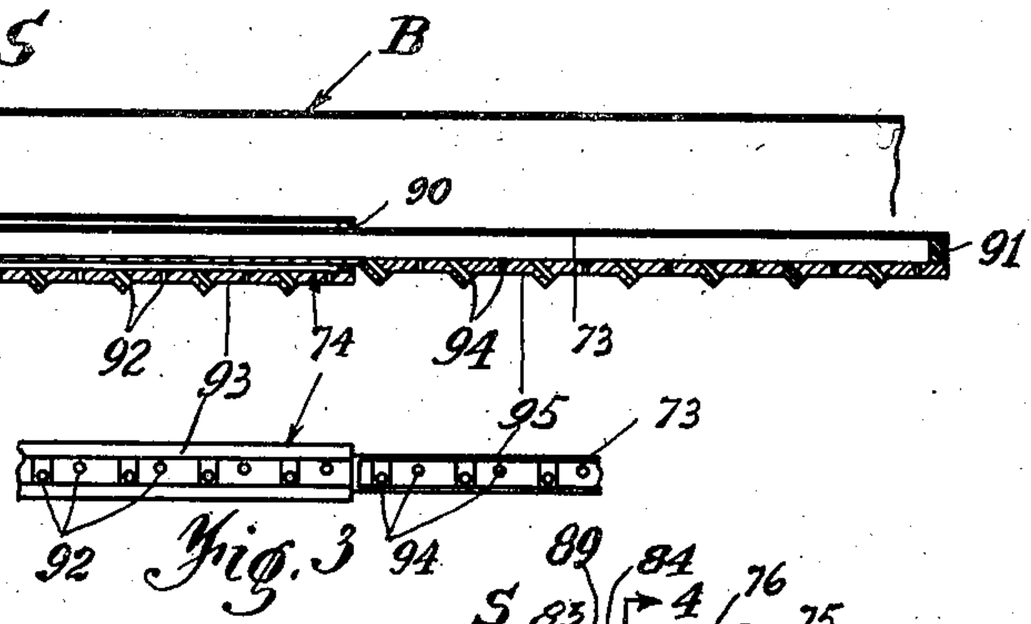

Fig. 3

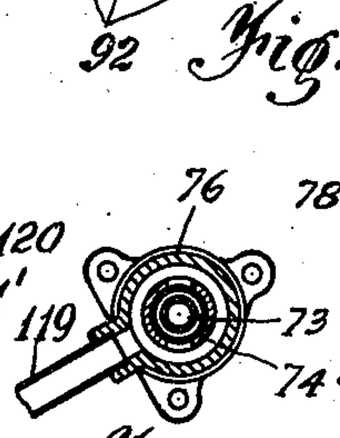

Fig. 4

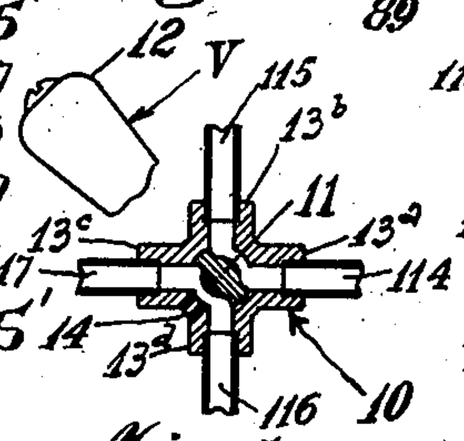

Fig. 5

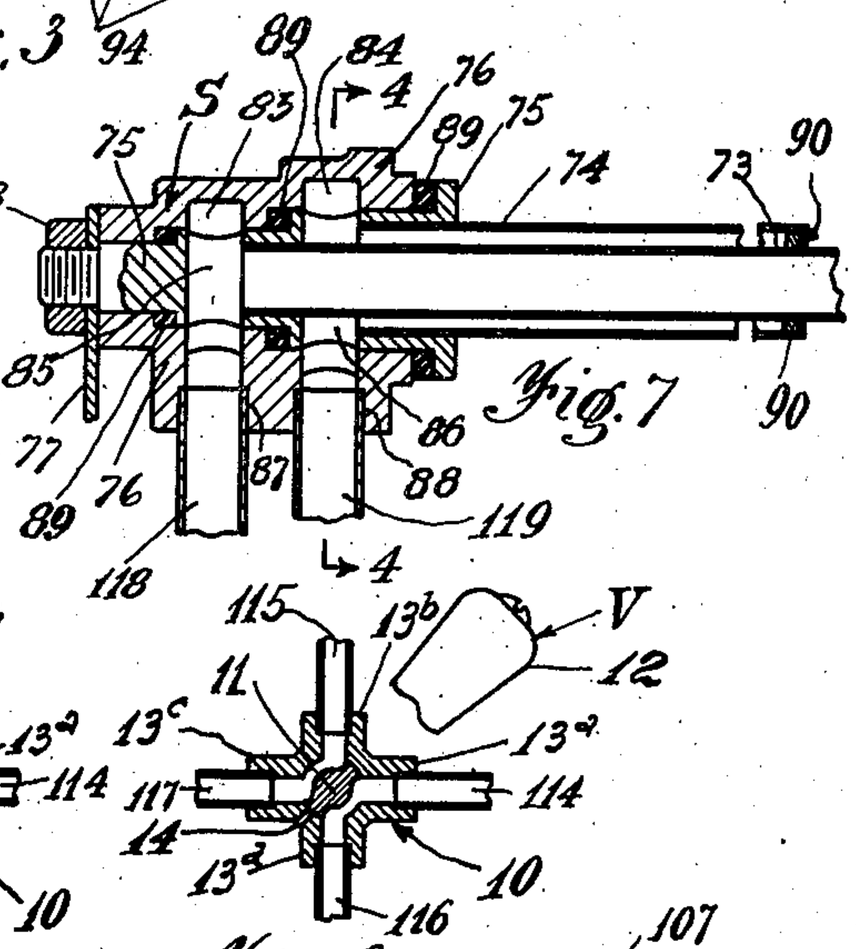

Fig. 7

Fig. 6

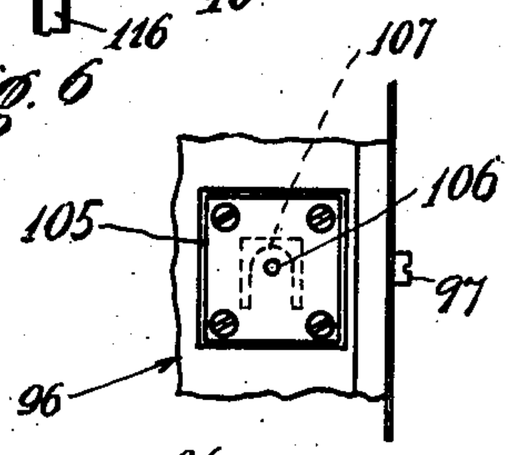

Fig. 8

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DISHWASHING MACHINE

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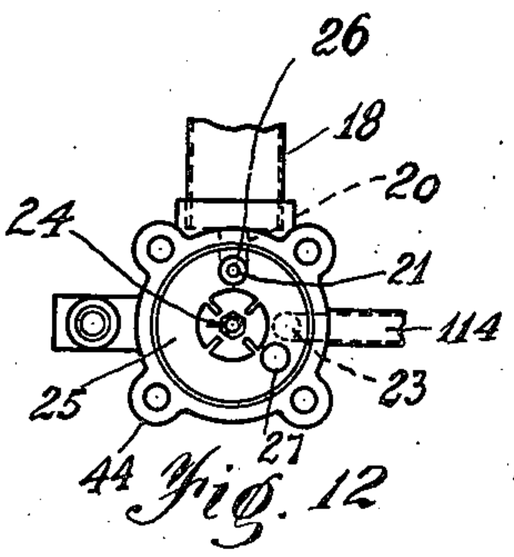


Fig. 12

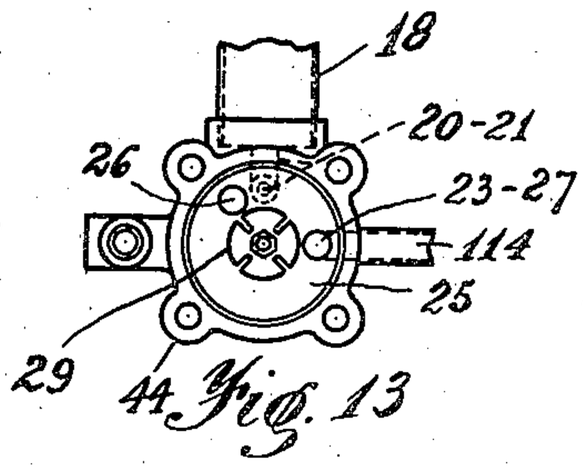
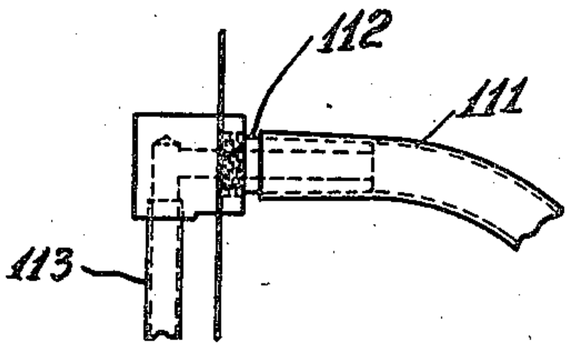


Fig. 13

Fig. 15

Fig. 14



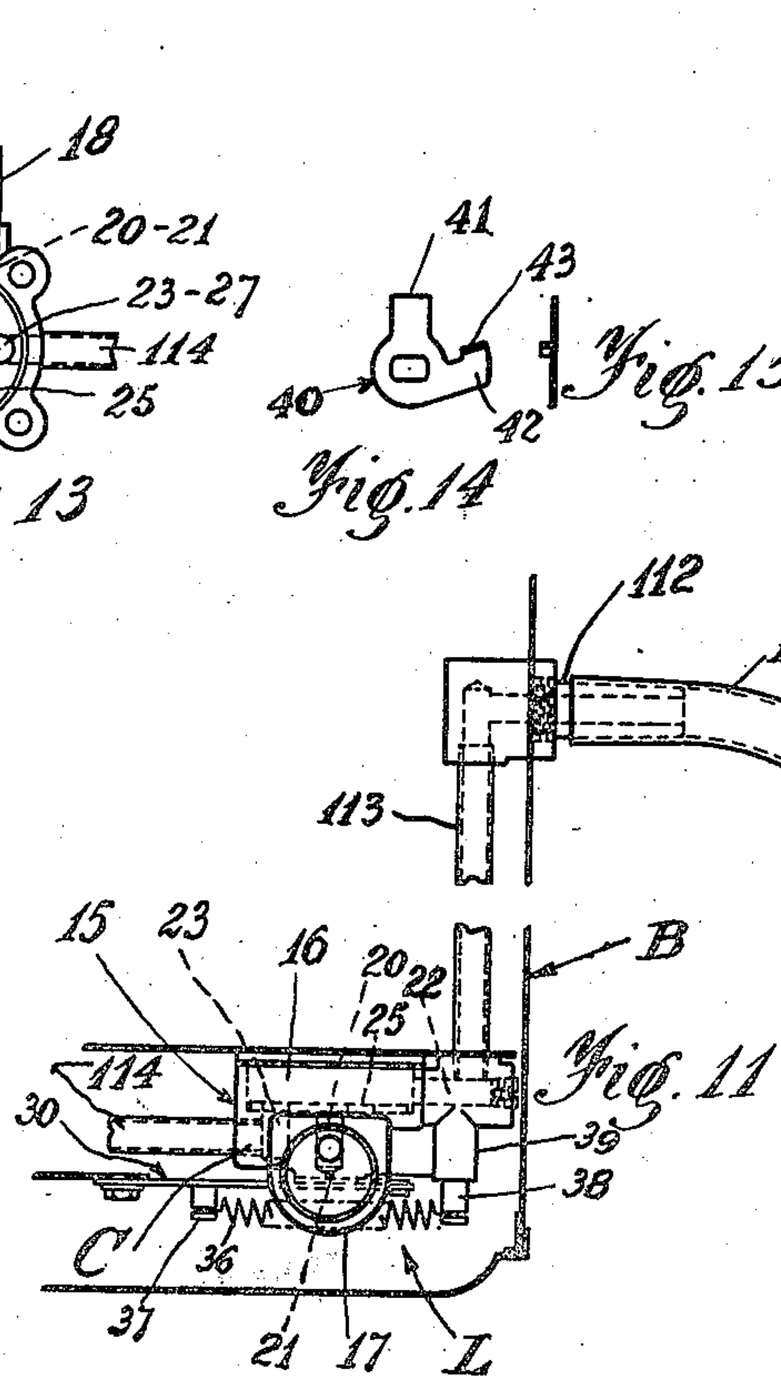


Fig. 11

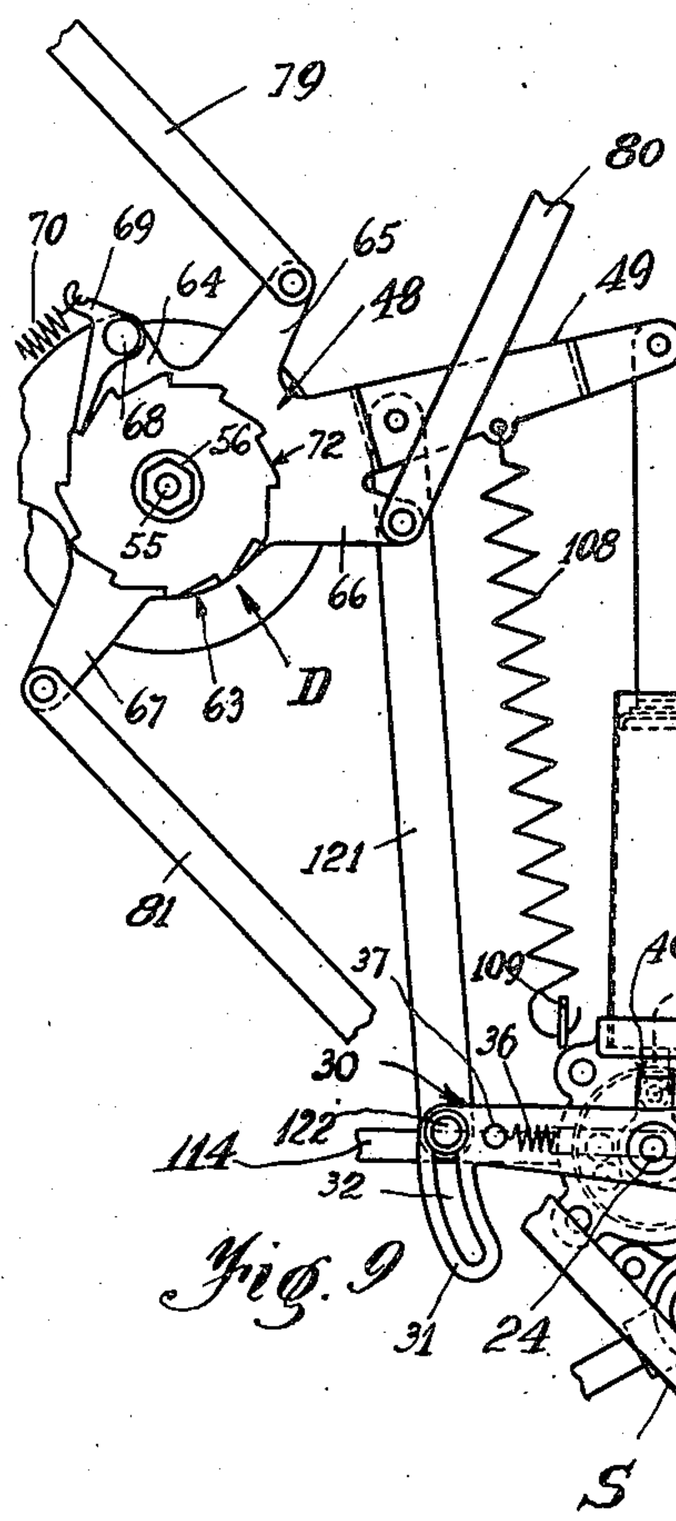


Fig. 9

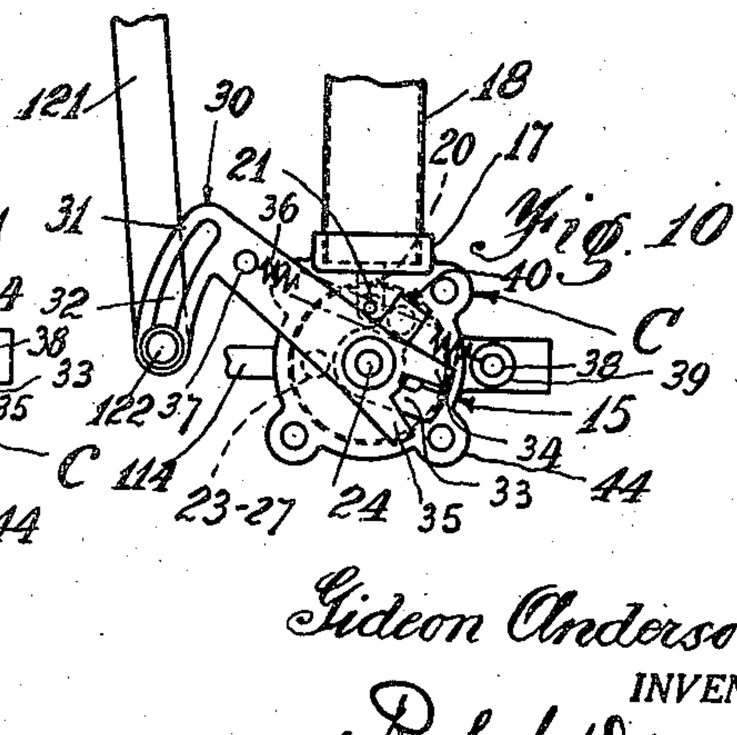


Fig. 10

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DISHWASHING MACHINE

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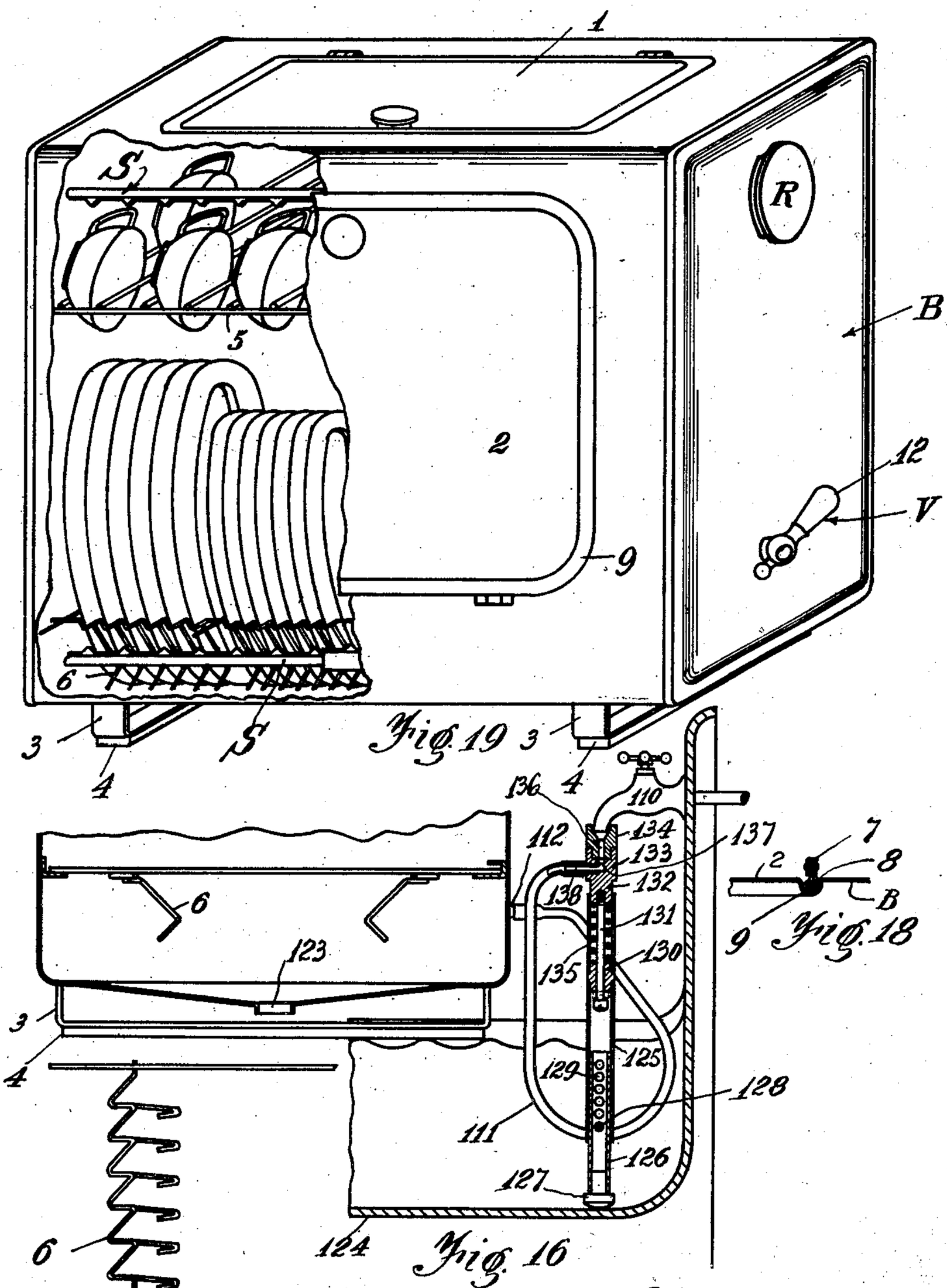

Fig. 19

Fig. 16

Fig. 18

Fig. 17

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Patented Aug. 20, 1935 2,012,178

UNITED STATES PATENT OFFICE

2,012,178

DISHWASHING MACHINE

Gideon Anderson, Irwin, Pa.

Application April 4, 1932, Serial No. 602,959

17 Claims. (Cl. 299—27)

This invention relates to dish washing machines.

One of the primary objects of this invention is to provide a dish-washing machine in which the water used for washing is forced successively and automatically through several spraying devices adapted to spray the water at different points upon the dishes to be washed. Another object of this invention is to provide a dish-washing machine of the sprayer type in which the direction of the sprays against the dishes will be varied automatically by the fluid pressure of the cleaning water. A further object of this invention is the provision in a dish-washing machine of a special container for soap adapted to be traversed by the cleaning water and whereby the latter will dissolve some of the soap to facilitate the initial cleaning of dishes. Still another object of this invention is to provide such a dish-washing machine which is very economical in operation, of compact construction and which is especially well suited for home use. Yet another object of this invention relates to a special type of adjustable hose connection whereby the dish-washing may be readily connected to most any kind of faucet used on kitchen sinks and the like.

Additional features and advantages of this invention will appear in the following description considered in connection with the accompanying drawings forming a part of this application.

In the drawings:—

Fig. 1 is an end view of the operating mechanism and piping of the dish-washing machine.

Fig. 2 is a cross-sectional view taken along various planes through the operating mechanism.

Fig. 3 is a fragmentary side view of one of the oscillating sprayers of the dish-washing machine.

Fig. 4 is a cross-section through the oscillating sprayer taken on line 4—4 of Fig. 7.

Figs. 5 and 6 are fragmentary sectional views showing two operative positions of the hand operated two-way valve of the device.

Fig. 7 is a fragmentary cross-section through one of the oscillating sprayers.

Fig. 8 is a top plan view of a flap valve for the air-vent of the soap container of the device.

Fig. 9 is a fragmentary side elevation of the valve operating mechanism of the cylinder and cooperative parts of the machine.

Fig. 10 is a similar view of said valve mechanism in a different operative position.

Fig. 11 is a top plan view of Fig. 10.

Figs. 12 and 13 are rear elevational views of said cylinder valve, the rear cover being removed.

Fig. 14 is a front elevation of the lever of said cylinder valve.

Fig. 15 is a side elevation of Fig. 14.

Fig. 16 is a fragmentary section through a kitchen-sink with the dish-washing machine placed thereon.

Fig. 17 is a fragmentary view of a wire tray for holding plates and the like in the machine.

Fig. 18 is a fragmentary sectional view showing one method of sealing the doors of the casing.

Fig. 19 is an isometric view, partly in section of the dish-washing machine.

I am aware of the existence of several types of dish-washing machines in which the dishes to be washed are subjected to jets of water issuing from stationary or oscillating spraying devices. To the best of my knowledge, these spraying devices are all operated simultaneously with the result that the hydrostatic pressure of the jets of water is greatly reduced owing to the subdivision of the water from the supply faucet into so many sprays and also due to the resistance offered by the many apertures in the sprayers.

This drop in hydrostatic pressure greatly impairs the effectiveness of the cleaning water, requires more time to do the cleaning and accordingly wastes considerable water.

In my device the spraying system is divided into groups of relatively few jets, which groups are brought successively and automatically into action against the dishes to be washed, thus overcoming the above mentioned deficiencies.

Reference being had to the drawings, a dish-washing machine built in accordance with this invention comprises as main elements a box-like casing B, a manually operated two-way valve V, a cylinder and cylinder valve mechanism C, a distributor valve D, a soap receptacle R, a plurality of oscillating sprayers S and a plurality of stationary sprayers S'. These various elements are partly or fully contained in a special compartment or chamber L provided at one end of the casing B.

Casing "B"

This casing is preferably of rectangular shape and made of metal suitably treated, as by enamelling or paint to protect it against corrosion. Hinged doors 1 and 2 are respectively provided at the top and front for putting the dishes into or out of the casing. The latter has feet or skids 3, preferably provided with a lining 4 of yielding material, such as rubber, to prevent marring the surface upon which the device is set. The cups and plates or other flat dishes are held in suit-

able wire-trays 5 and 6 of any suitable design and which are usually built in sections to facilitate their insertion into or removal from the casing.

The edges of the door openings are bent inwardly to form the flanges 7, Fig. 18, to which are secured rubber sealing gaskets 8 the outer ends of which are preferably enlarged and hollow, to increase their resiliency, and fit within continuous marginal grooves 9 provided in the doors, whereby the escape of heated air or steam from the casing is practically prevented.

Operating valve "V"

This valve is of the two-way type and comprises a valve body 10 within which is rotatably mounted the plug-valve 11 manually operable by means of a handle 12. The body has four pipe hubs 13a, 13b, 13c and 13d, into which pipes to be described hereafter are secured, and a drain hole 14 positioned intermediate the hubs 13c and 13d.

Cylinder and cylinder valve "C"

As shown in particular in Figs. 9 to 15, this valve comprises a valve-body 15 having a cylindrical valve-chamber 16 and a cylinder head 17 into which is secured the vertical cylinder 18, open at the top. The valve chamber communicates with the cylinder by a duct 20, said chamber being also provided with a drain-hole 21. Water may circulate through the valve chamber by way of the inlet port 22 (Fig. 11) and outlet port 23 the latter being drilled substantially normal to the flat bottom of said chamber. Rotatably mounted centrally of the valve-body is a pivot-pin 24 at the inner end of which is secured the valve-plate 25 having two holes 26 and 27 adapted to register respectively with the duct 20 and with the outlet-port 23. The valve plate is slidably held against the bottom of the valve chamber by the bolt-nut 28 and the spring washer 29 (Fig. 2).

On the outer end of the pivot-pin 24 is rotatably mounted a lever 30 having at the outer end an angularly disposed arm 31 in which is cut an elongated arcuate slot 32, while the inner end of said lever is slotted as at 33 to produce the two extensions 34 and 35. A tension spring 36 having one end secured to a point of attachment 37 on the lever 30 and the other end secured to a stationary point 38 provided on the boss 39 cast on the valve body is used to snap the lever upwardly as soon as the longitudinal axis of the spring moves above the center of the pivot pin.

Placed intermediate the lever 30 and the valve body is the valve-trigger 40 suitably held on the pivot pin for rotation therewith. This trigger has two angularly disposed arms 41, 42, the former being adapted to cover the drain hole 21 and the latter having an outwardly directed lug 43 placed within the slot 33 and adapted to be engaged by the inner edge of either lever-extension 34, 35. Suitable apertured lugs 44 are provided on the valve-body for securing same at any desired place in the casing-chamber L.

A piston 45 of any suitable design allowing for angular movement as well as longitudinal movement operates within the cylinder. In the present embodiment, a cup-shaped leather piston 46 is used which is secured in any suitable manner to the piston-rod 47.

Distributing valve "D"

This valve is automatically operated by the up and down movements of the piston 45, by means of the distributor lever 48, the long arm 49 of which is hingedly connected to the outer end of the piston rod 47.

The distributing valve comprises the valve-body 50 having a cylindrical valve chamber 51 with a flat bottom and closed by a suitable cover 52. Circumferentially of the valve body are uniformly disposed ducts 53 (twelve in this embodiment) which terminate at right angles into the bottom of the valve-chamber to form the concentrically disposed and evenly spaced ports 54. Pipes, to be described later, connect the ducts 53 with the various spraying devices.

A valve-shaft 55 is rotatably supported by the cover 52 and valve body 50 and is held in place by a nut 56 screwed on the threaded shank 57 at the rear end of the shaft. The distributor-lever 48 can rotate freely about this shaft and is held at the front end thereof by another nut 58 engaging the threaded shank 59. Mounted on the shaft and rotating therewith is the valve-disc 60 which is yieldingly held against the bottom of the chamber by the spring-washer 61. This disc has a hole 62 adapted to register successively with all the ports 54.

The distributor-lever has an enlarged hub 63 from which radiate, in this embodiment, the four arms 64, 65, 66 and 67. Upon this hub is also rockably mounted at 68 a pawl 69 acted upon by a spring 70 secured at its outer end in the apertured lug 71 on arm 64. This lever is acted upon by a spring 108 which tends to rotate it in a clockwise direction. Said spring is secured at one end to the arm 49 and at the other end to a stationary lug 109 suitably fastened in the chamber L. Also hingedly secured to the arm 49 is a connecting-link 121 having at its lower end a pin 122 which slidably engages the slot 32 of the lever 30 on the cylinder-valve C.

On the shaft 55 is keyed or otherwise secured, the ratchet wheel 72 having the same number of teeth as there are ports 54 (twelve in this case) in the valve body.

Oscillating sprayers "S"

In the present embodiment four such sprayers are disposed substantially in the corners of the dish compartment of the casing B.

Each oscillating sprayer consists of two concentrically disposed telescoped sprayer-tubes 73 and 74 of different diameters and lengths, which tubes are secured in a common plug 75 rotatably mounted in a housing 76. This plug and the tubes may be oscillated by means of a lever 77 secured by a nut 78. Connecting rods 79, 80, 81 and 82 connect the four oscillating sprayers respectively to the arms 65, 66, 67 and 64 of the distributor lever 48.

As shown especially in Fig. 7, the housing 76 has two annular chambers 83 and 84 which communicate respectively with the inner and outer spray-tubes 73 and 74 via the ports 85 and 86 provided in the plug 75, and the chambers have outlets 87 and 88 to which are connected pipes, to be specified hereafter. Suitable gaskets 89 are used to maintain sealing contacts of the plug with the housing.

The end of the larger and shorter spray tube 74 is closed onto the inner tube as at 90 and the inner tube is also closed at its outer end as at 91. The spray-holes 92 in the tube 74 are preferably drilled in staggered and angular relation in a special strip 93 of metal, such as bronze, soldered to the said tube to prevent the sprays from ad-

jacent holes to immediately intersect each other and, therefore, lose considerably of their hydrostatic pressure. The spray-holes **94** of the tube **73** are similarly arranged in a strip **95**.

Soap receptacle "R"

This receptacle as shown in Figs. 2 and 8 in particular consists of a casing **96** secured to the inner wall of the compartment L by screws **97** and to the outer wall thereof by a clamping collar **98** screwed on the casing. A screw threaded cap **99** closes the outwardly protruding end of the casing. The soap holder **100** is centrally disposed within the casing; it is preferably made of sheet metal, is open at the front and its bottom is secured to the bottom of the casing. In the cylindrical shell of said holder are provided perforations **101** of suitable size and number through which the water entering the the casing may reach a cake of soap (not shown) placed in the holder and dissolve the former gradually to produce the soapy water used, preferably, for the initial cleaning of dishes.

In the casing are the inlet hole **102** and the outlet hole **103** for the cleaning water, said holes being connected to pipes, to be described hereafter. At the top of the casing there is an opening **104** closed by a flat cover **105** in which is drilled a vent-hole **106** which is closed by a flap-valve **107** made of resilient material, such as rubber, when water under pressure enters the casing. This flap-valve however opens this vent-hole to let air into the casing when the soapy water is drained therefrom.

Pipe connections

Water for cleaning dishes is usually obtained from the hot water faucet **110** of a kitchen sink by means of a flexible hose **111** connected at its other end to a hose connector **112**, Fig. 11, secured on the rear wall of the casing B. From this connector a pipe **113** leads into the inlet-port **22** of the cylinder-valve C, the outlet-port **23** of which is connected by horizontal pipe **114** to the pipe-hub **13a** of the valve V. From pipe-hub **13b** a pipe **115** leads into the valve-chamber **51** of the distributing valve D, and from hubs **13d** and **13c** pipes **116** and **117** connect said valve with the inlet hole **102** and outlet hole **103** respectively of the soap-receptacle R.

From the twelve ducts **53** of the distribution valve D radiate an equal number of pipes going to the four oscillating-sprayers S and the four stationary S^1. Each oscillating-sprayer S is supplied with water by two pipes **118**, **119** communicating at their lower ends with two adjacent ports **53** of the valve D and at their upper ends respectively with the annular chambers **83** and **84** of said sprayers. The stationary sprayers S', however, are each connected to the distributing valve D by a single pipe **120**.

Operation

Assuming that the dishes to be cleaned have been placed into the trays **5** and **6**, and the hose **111** applied to the faucet **110**, the handle **12** of the operating valve V is turned to the right (see Fig. 6) and the faucet opened. Hot water will flow from the latter into the chamber **16** of the cylinder valve C, the valve-plate **25** of which is in the position shown in Fig. 12 with the valve-hole **26** registering with the cylinder duct **20**. The water pressure forces the piston **45** upward substantially into the position shown in Fig. 9. The upward motion of the lever **48** imparts to the pawl actuated ratchet **72** and to the valve-disc **60** a counter clockwise rotation which brings the hole **62** in said disc into registry with the next following port **54**. The connecting-link **121** moves upward with the arm **49** placing the lever **30** first in the substantially horizontal position shown in Fig. 9.

As soon as the longitudinal axis of the spring **36** rises above the center of the pivot-pin **24**, the tensioned spring causes the lever **30** to snap upward as far as the slot **32** will permit, into the position shown in Fig. 10. This causes the inner edge of the lever extension **34** to engage the lug **43** on the valve trigger **40** (Fig. 14) thus rotating same clockwise, so that the arm **41** of said trigger will uncover the drain-hole **21** of the valve C; at the same time the valve-plate **25** shuts off the inlet-duct **20** to the cylinder and simultaneously brings the valve hole **27** in line with the outlet port **23**, see Figs. 10 and 13.

The tension spring **108** now causes the piston to travel down into the cylinder, the water contained therein escaping through the drain hole **21** into the casing B and thence through a drain hole **123** provided into the bottom thereof into the sink **124**, Fig. 16.

Water may now flow from the chamber **16**, via valve-hole **27**, outlet port **23** and the pipe **114** into the operating valve V which, as stated, is in the position shown in Fig. 6. Thence via pipe **116** the water enters the soap-receptacle where it dissolves some of the soap. The soapy water then travels by way of the pipe **117** into the other side of the valve V and thence through pipe **115** into the chamber **51** of the distributing valve D.

Assuming, for instance that the hole **62** of the valve-disc **60** be in registry with the valve port **54a** (Fig. 1), this soapy water will then enter, by way of the pipe **119**, the annular chamber **84** of the oscillating sprayer S (positioned at the upper left hand corner in Fig. 1), enter the annular space between the sprayer-pipes **73** and **74** and issue through the spray-holes **92** of the latter in strong jets directed against the dishes.

At the end of the next upward stroke of the piston **45**, Fig. 9, the hole **62** in the valve-disc **60** will registed with the valve-part **54b**. During the downward stroke of the piston the soapy water will enter, via pipe **118**, the chamber **83** of the same sprayer S supplying said water to the inner tube **73** whence it emerges in sprays through the spray-holes **94**.

It will be noted that the oscillating movements of the lever **48**, produced by the up and down strokes of the piston **45**, cause the sprayer tubes to oscillate, the lever arms **77** being generally so proportioned relative to their corresponding arms on the lever **48** to cause the jets of water emerging from said sprayer-tubes to swing about an arc of substantially 90°.

The next upward stroke of the piston will bring the valve hole **62** in line with the port **54c** and supply soapy water to the pipe **120** and the stationary sprayer S', at the left in Fig. 1.

The distribution of soapy water to the various sprayers will proceed automatically as above described, as long as the operating valve V remains in the position illustrated in Fig. 6.

After sufficient soapy water has been sprayed upon the dishes for the first washing thereof, the operating valve V is then turned to the left as in Figs. 1 and 5, to spray pure hot water on the dishes.

The water entering said valve will go directly via pipe **115** into the distributing valve D, without first passing through the soap receptacle R,

and the soapy water remaining in the latter will run out through the pipe 117 and the drain hole 14 in the valve, due to the fact that, by the action of the atmospheric pressure, the flap-valve 107 will open the vent-hole 106 of the soap receptacle thus preventing the formation of a vacuum therein which would prevent the outflow of the remaining soapy water.

The operation of the distributing valve D with pure water is, of course, identical as described hereinabove with respect to soapy water.

In conjunction with Fig. 16 there is illustrated a novel device of my invention for quickly connecting the rubber hose of the dish-washing machine with a faucet 110.

As shown therein this device comprises a tubular column 125 in the lower end of which is freely inserted a tubular foot 126 terminating with a heel 127 made of resilient material, such as rubber, to not mar the surface of the sink 124 upon which it bears. This foot is held in the desired position by a removal pin 128 adapted to simultaneously engage a through hole provided in the column 125 and either one of the several holes 129 provided along said foot, and whereby the effective length of the device may be varied to suit local conditions.

Intermediate the ends of said column there is secured an interior plug 130, centrally apertured to slidably receive a long bolt 131 screwed into a plunger 132 freely engaging the column and forming part of the connector head 133. The latter is recessed at the top to receive a rubber socket 134 which is adapted to engage the spout of the faucet. A spring 135 is inserted between the plug 130 and the plunger 132 to yieldingly hold the socket against the faucet in a leak proof manner. This socket has a central through-aperture 136 which registers with a duct 137 formed in the head 133 and communicating with a nipple 138 laterally disposed on the head and to which the rubber hose is permanently secured. A downward pressure exerted on the head will release the device from the faucet.

As will be understood, there may be changes made in the construction and arrangement of the details of my invention without departing from the field and scope of the same, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention is disclosed.

I claim:

1. In a dish washing machine, a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured at one end of said tubes and having ports in communication therewith; a housing constructed to rotatably support said plug and having independent chambers communicating with said ports; means to close the other ends of said tubes; independent pipes to connect said chambers to a water supply; a plurality of outlets positioned on said tubes, and means to oscillate said plug and tubes.

2. In a dish washing machine, a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of the tubes; two independent pipes to connect said chambers to a water supply; a plurality of outlets positioned longitudinally on said tubes and disposed in alternate normal and oblique relation thereto, and means to oscillate said plug and tubes.

3. In a dish washing machine, a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said tubes; two independent pipes to connect said chambers to a water supply; a plurality of outlets positioned longitudinally on said tubes and disposed in staggered alternately normal and oblique relation thereto whereby adjacent jets of water emerging from said outlets will not intersect each other.

4. In a dish washing machine, a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said tubes; two independent pipes to connect said chambers to a water supply; a plurality of outlets positioned longitudinally on said tubes; means to oscillate said plug and tubes, and means to successively supply water to said sprayers.

5. In combination with a casing, a hydraulic prime mover; means to supply water thereto; a rotatable distributor-valve; an operating lever therefor; means to actuate said lever by the prime-mover; pipe connections between the distributor-valve and said prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said pipes; independent pipes connecting the distributor-valve to the chambers in said housing; a plurality of outlets positioned on said tubes; connecting rods connecting the operating lever to said sprayers; said distributor-valve being constructed to successively supply water to said sprayers.

6. In combination with a casing, a hydraulic prime mover; means to supply water thereto; a rotatable distributor-valve; a shaft therefor; an operating lever for the distributor-valve freely mounted on said shaft; means to rock said lever by the prime-mover; means to rotate the distributor-valve by said lever; pipe connections between the distributor valve and the prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plugs and having separate chambers communicating with said ports; means to close the outer ends of said tubes; independent pipes connecting the distributor valve to said chambers;

a plurality of outlets positioned on said tubes; connecting-rods connecting the operating lever to said sprayers; said distributor valve being constructed to successively supply water to said sprayers.

7. In combination with a casing, a hydraulic prime-mover; means to supply water thereto; a rotatable distributor-valve; a shaft therefor; an operating lever for the distributor valve freely mounted on said shaft; means to rock said lever by the prime-mover; means to rotate the distributor-valve in one direction by said lever; pipe connections between the distributor-valve and the prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said tubes; independent pipes connecting the distributor-valve to said chambers; a plurality of outlets positioned on said tubes; connecting-rods connecting the operating lever to said sprayers; said distributor-valve being constructed to successively supply water to said sprayers.

8. In combination with a casing, a hydraulic prime-mover; means to supply water thereto; a rotatable distributor-valve; a shaft therefor; an operating lever for the distributor-valve freely mounted on said shaft; means to rock said lever by said prime-mover; a pawl and ratchet mechanism interposed between said lever and distributor-valve to rotate same in one direction; pipe connections between the distributor-valve and the prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said tubes; independent pipes connecting the distributor-valve to said chambers; a plurality of outlets positioned on said tubes; connecting-rods connecting the operating lever to said sprayers; said distributor-valve being constructed to successively supply water to said sprayers.

9. In combination with a casing, a hydraulic prime-mover; means to supply water thereto; a rotatable distributor-valve; a shaft therefor; an operating lever for the distributor-valve freely mounted on said shaft; means to rock said lever in one direction by the prime-mover; independent means to rock the lever in the other direction; means to rotate the distributor-valve in one direction by said lever; pipe connections between the distributor-valve and the prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said tubes; connecting-rods connecting the operating lever to said sprayers; said distributor-valve being constructed to successively supply water to said sprayers.

10. In combination with a casing, a hydraulic prime-mover; means to supply water thereto; a rotatable distributor-valve; a shaft therefor; an operating lever for the distributor-valve freely mounted on said shaft; means to rock said lever in one direction by the prime-mover; independent spring-means to rock the lever in the other direction; means to rotate the distributor-valve in one direction by said lever; pipe connections between the distributor-valve and the prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said pipes; independent pipes connecting the distributor-valve to said chambers; a plurality of outlets positioned longitudinally on said tubes and disposed in alternate normal and oblique relation thereto; connecting-rods connecting the operating-lever to said sprayers; said distributor-valve being constructed to successively supply water to said sprayers.

11. In combination with a casing, a hydraulic prime-mover comprising a cylinder and a piston reciprocable therein; means to supply water under pressure to the prime-mover; a rotatable distributor-valve; a shaft therefor; an operating lever for the distributor-valve freely mounted on said shaft; connecting means between said piston and lever to rock same in one direction during the outward stroke of the piston; means to rotate the distributor-valve in successive steps in one direction by said lever; independent means to rock said lever in the other direction; pipe-connections between the distributor-valve and the prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said tubes; independent pipes connecting the distributor-valve to said chambers; a plurality of outlets positioned on said tubes; connecting-rods connecting the operating lever to said sprayers; said distributor-valve being constructed to successively supply water to said sprayers.

12. In combination with a casing, a hydraulic prime-mover comprising a cylinder and a piston reciprocable therein; means to supply water under pressure to the prime-mover; a rotatable distributor-valve; a shaft therefor; an operating lever for the distributor freely mounted on said shaft; connecting means between said piston and lever to rock same in one direction during the outward stroke of the piston; means to rotate the distributor-valve in successive steps in one direction by said lever; independent unitary means to rock said lever in the other direction and effect the inward stroke of the piston; pipe connections between the distributor-valve and the prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug se-

cured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said tubes; independent pipes connecting the distributor-valve to said chambers; a plurality of outlets positioned on said tubes; connecting-rods connecting the operating lever to said sprayers; said distributor-valve being constructed to successively supply water to said sprayers.

13. In combination with a casing, a hydraulic prime-mover comprising a cylinder and a piston reciprocable therein; means to supply water under pressure to the prime-mover; a rotatable distributor-valve; a shaft therefor; an operating lever for the distributor-valve freely mounted on said shaft; connecting means between said piston and lever to rock same in one direction during the outward stroke of the piston; means to rotate the distributor-valve in successive steps in one direction by said lever; a spring having one end secured to a stationary support and the other end secured to said lever to simultaneously rock the operating lever in the other direction and effect the inward stroke of said piston; pipe connections between the distributor-valve and the prime-mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; means to close the outer ends of said tubes; independent pipes connecting the distributor-valve to said chambers; a plurality of outlets positioned on said tubes; connecting-rods connecting the operating lever to said sprayers said distributor-valve being constructed to successively supply water to said sprayers.

14. In a dish washing machine, a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; two independent pipes to connect said chambers to a water supply; a plurality of outlets positioned on said tubes; means to oscillate said plugs and tubes; means to successively supply water to said sprayers and means to sequently discharge water through the short and long tubes of each sprayer.

15. In a dish-washing machine, a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; two independent pipes to connect said chambers to a water supply; a plurality of outlets positioned on said tubes; means to oscillate said plugs and tubes; and unitary means to successively supply water to said sprayers and the individual tubes thereof.

16. In combination with a casing, a hydraulic prime mover; means to supply water thereto; a rotatable distributor-valve; an operating lever therefor; means to actuate said lever by the prime mover; pipe connections between the distributor-valve and said prime mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; independent pipes connecting the distributor-valve to the chambers in said housing; a plurality of outlets positioned on said tubes; connecting rods connecting the operating lever to said sprayers; said distributor-valve being constructed to successively supply water to said sprayers and the individual sprayer-tubes thereof.

17. In combination with a casing, a hydraulic prime mover; means to supply water thereto; a rotatable distributor-valve; an operating lever therefor; means to actuate said lever by the prime mover; pipe connections between the distributor-valve and said prime mover; a plurality of oscillatable sprayers each consisting of a short outer tube and a long inner tube disposed in concentric spaced relation therewith; a common plug secured to the inner ends of said tubes and having separate ports in communication therewith; a housing constructed to rotatably support said plug and having separate chambers communicating with said ports; independent pipes connecting the distributor-valve to the chambers in said housing; a plurality of outlets positioned on said tubes; connecting rods connecting the operating lever to said sprayers; said distributor-valve being constructed to successively supply water to the individual tubes of one sprayer and subsequently to the other sprayers.

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