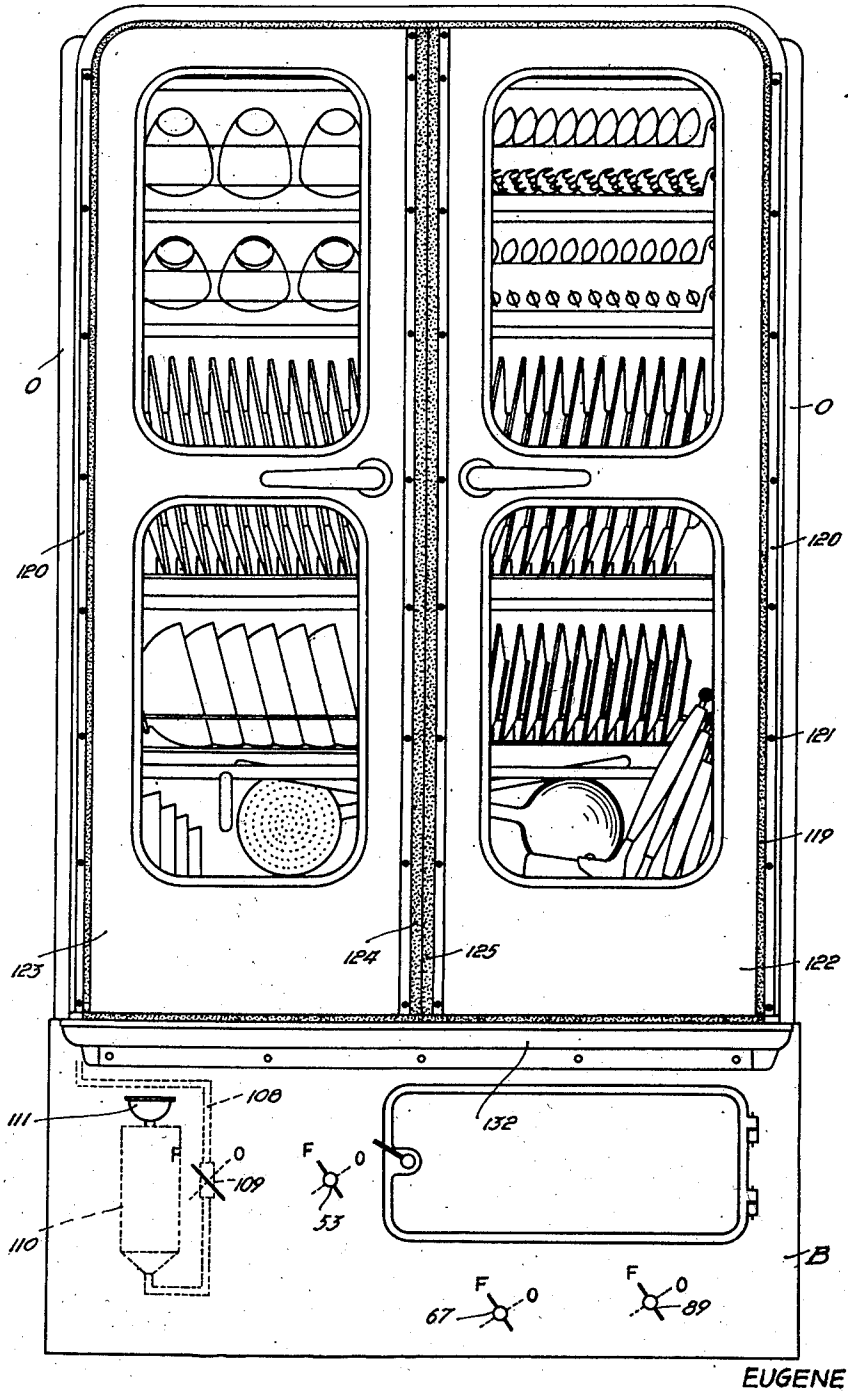
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METHOD OF WASHING DISHES OR THE LIKE

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Fig. 1



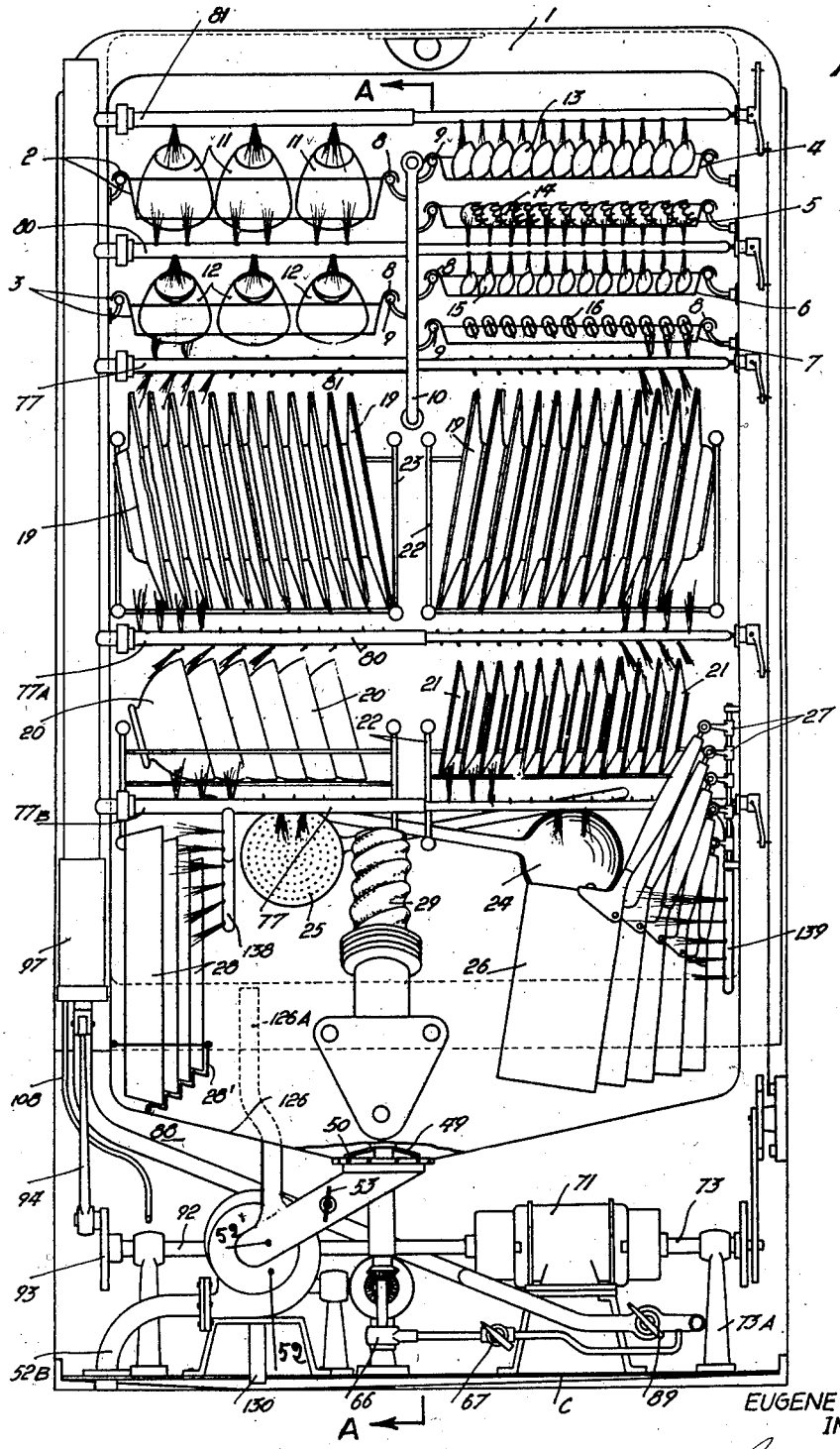
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Fig. 2



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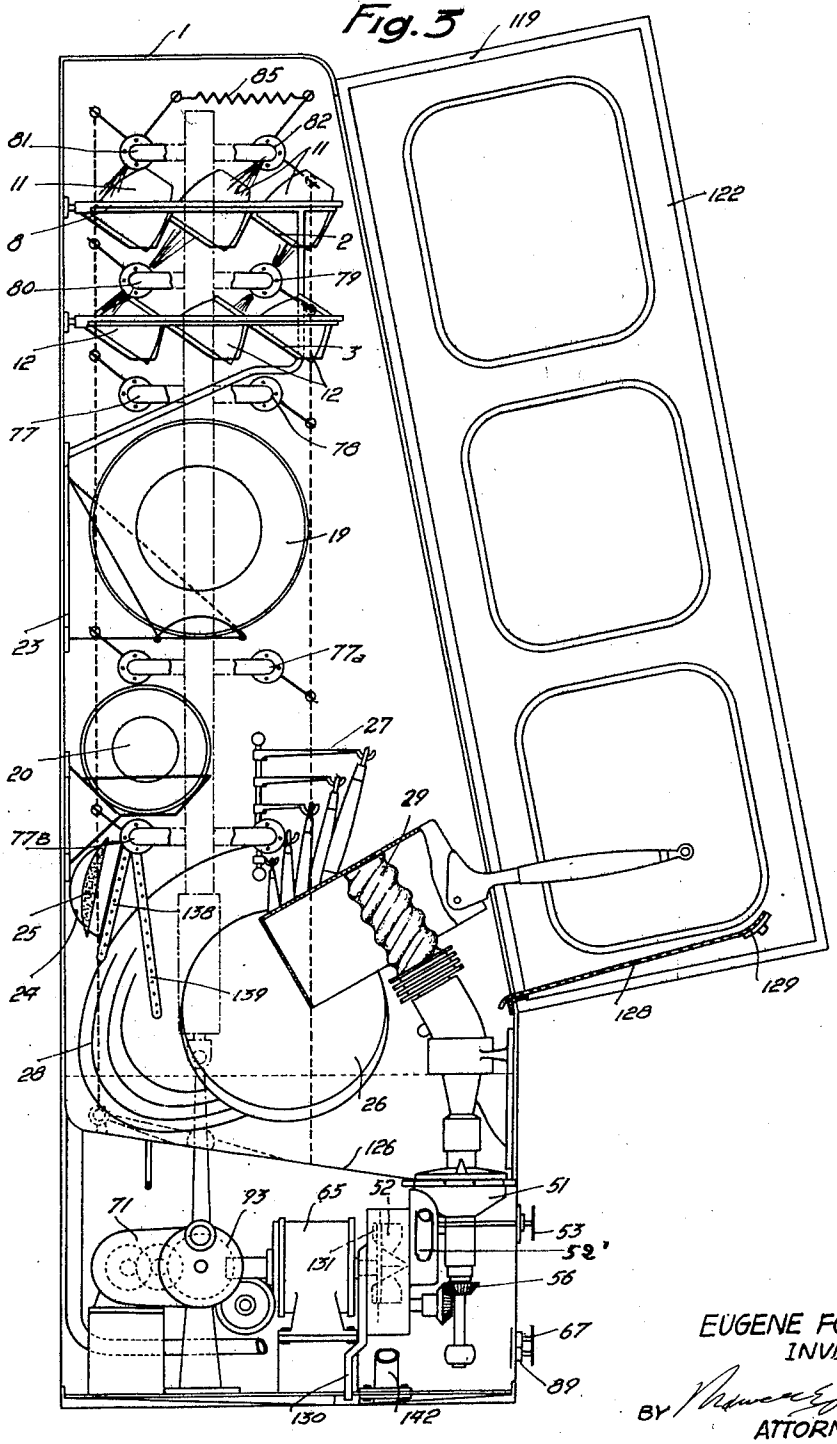
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Fig. 3



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Fig. 4

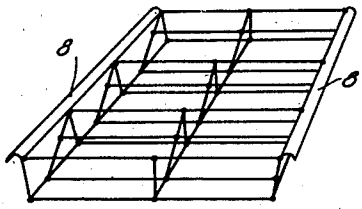


Fig. 5

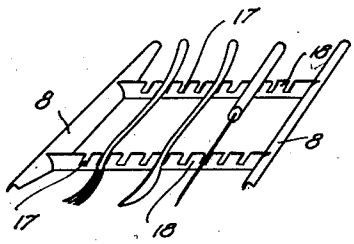


Fig. 6

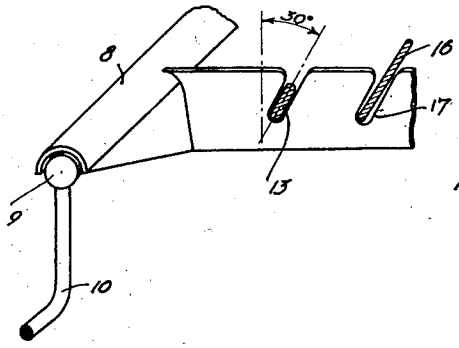


Fig. 10

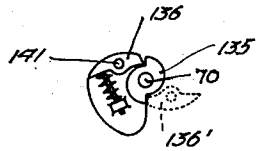


Fig. 12

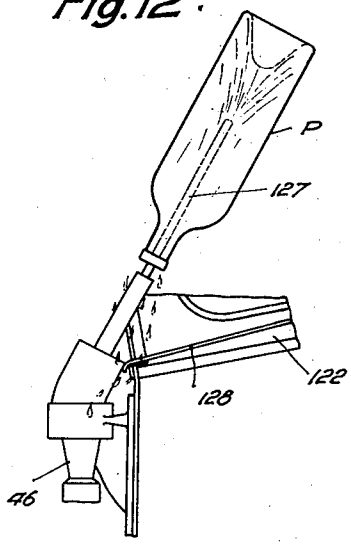
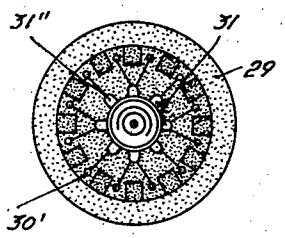


Fig. 11



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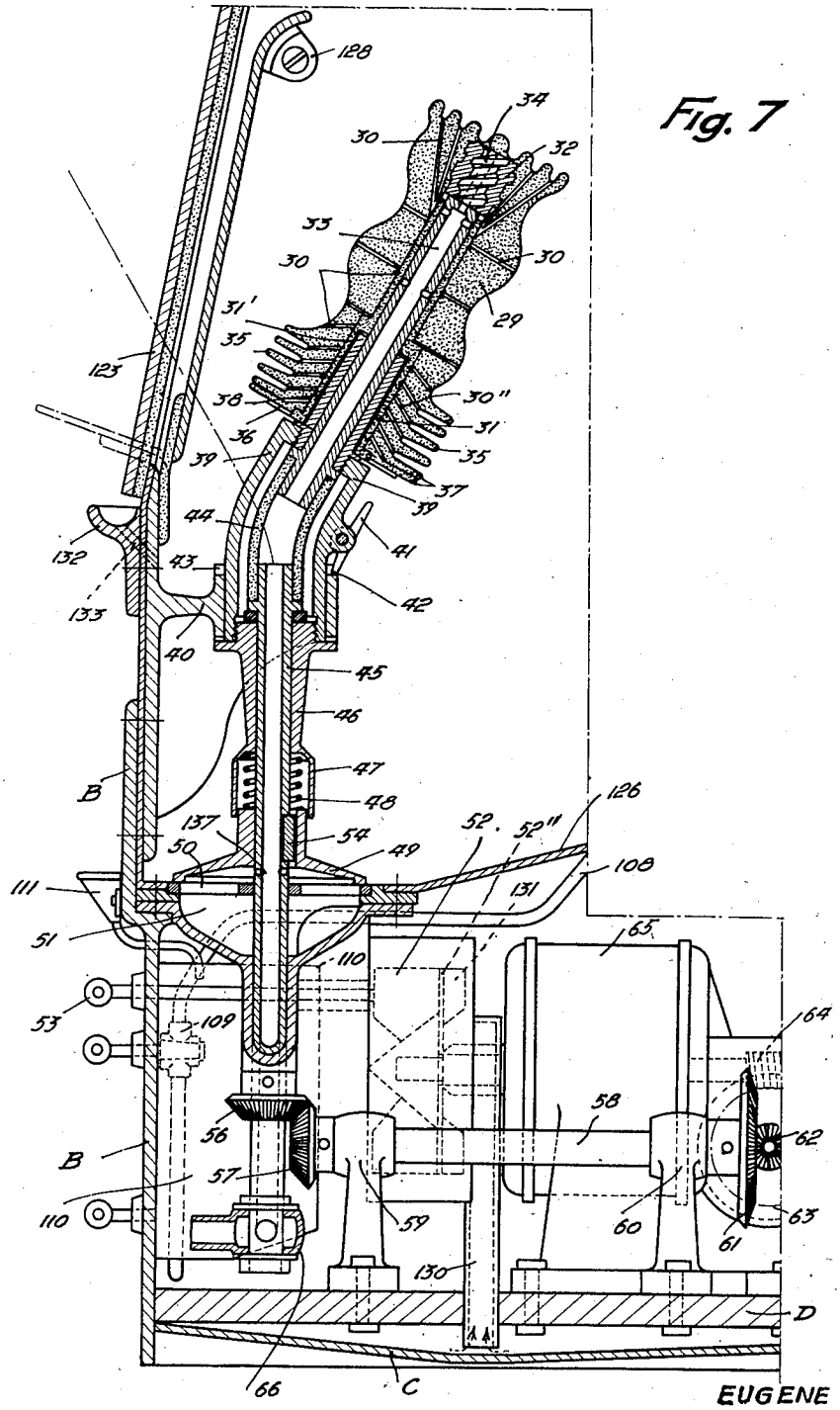
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Fig. 7



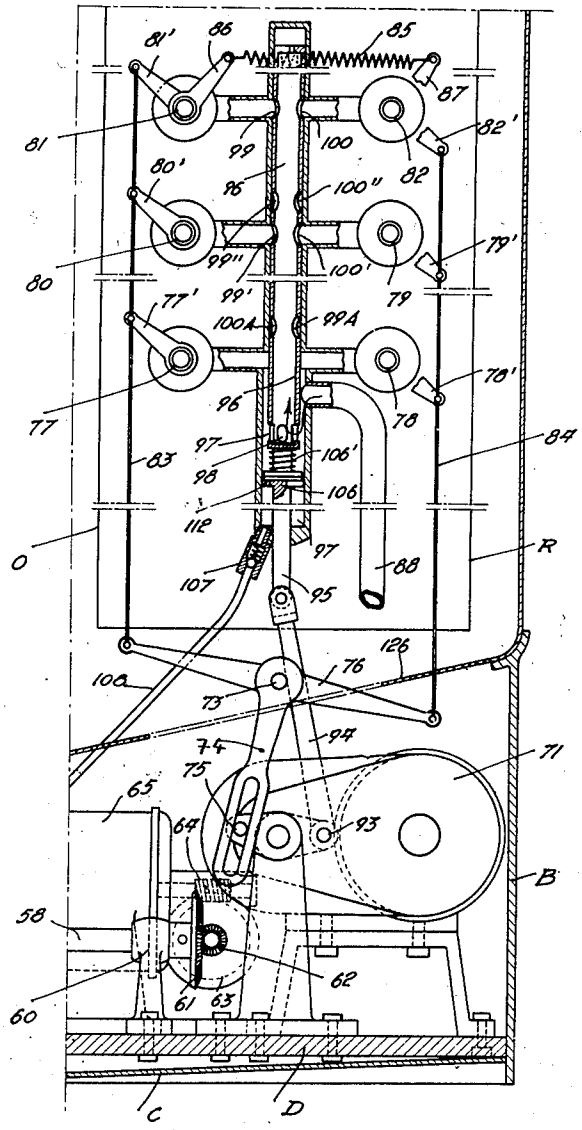
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Fig. 8



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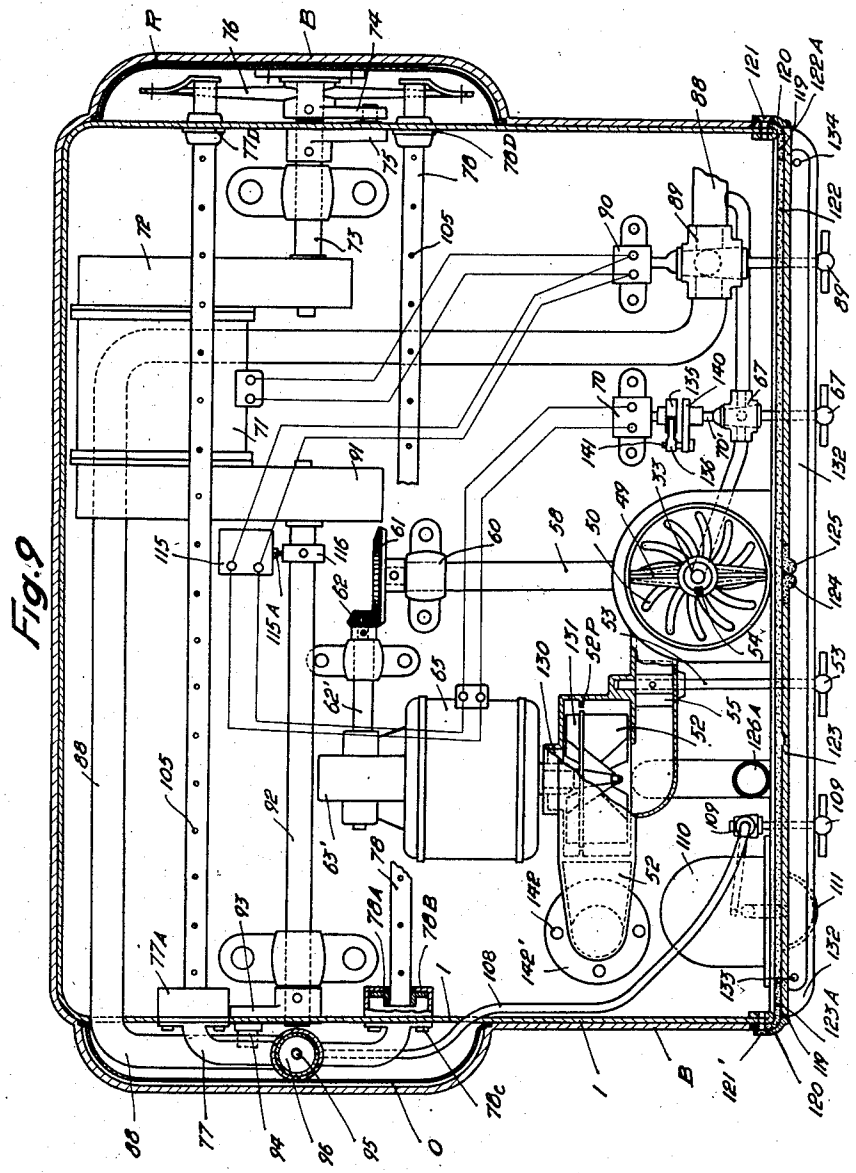
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METHOD OF WASHING DISHES OR THE LIKE

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Fig. 9



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United States Patent Office

2,798,012

Patented July 2, 1957

2,798,012

METHOD OF WASHING DISHES OR THE LIKE

Eugene Fouquet, Bois-Colombes, France

Application December 9, 1953, Serial No. 397,154

Claims priority, application France December 10, 1952

1 Claim. (Cl. 134—34)

The present invention relates to a new and improved process of washing, drying and storing dishes or the like in general and more particularly to a new and improved dish washing machine for washing, drying and storing said dishes or the like.

It is an object of the present invention to provide an automatic washing and drying process of dishes or the like which have been stacked up before the start of the procedure in a systematic order and in a geometric position determined with respect to hygienic reasons and to ease of handling.

Another object of the present invention is to provide a dishwashing and drying process wherein the dishes or the like remain unmoved in their place.

A further object of the present invention is to provide a process of washing dishes or the like wherein jets of hot water together with added detergents are directed under pressure against certain predetermined parts of the items to be cleaned.

Yet another object of the present invention is to provide a machine for washing and drying dishes or the like which serves at the same time as a kitchen cabinet for storing same.

A further object of the present invention is to provide for a machine washing and drying dishes or the like in which groups of pivotally mounted and angularly moved pipes are arranged to direct jets of hot water and detergents at various angles against the dishes or the like which are to be cleaned.

Another object of the present invention is to provide an apparatus of the class described which is of a sturdy design and comprises easily operable mechanisms.

Another object of the present invention is to present a new and useful articles of manufacture which can be produced economically.

The washing process consists essentially in directing jets of hot water with detergents added under pressure against predetermined parts of the stationary items whereby each one of said items receives at least one jet of water against its upper surfaces and another jet of water against its inner surfaces.

The apparatus comprises for this purpose a number of horizontally arranged groups of water pipes which alternate with drawers carrying the objects to be cleaned and which are arranged to be oscillated angularly around its longitudinal axis in order to change the points of impact of the jets of water according to a predetermined cycle.

The apparatus comprises furthermore a distributing means which is driven slidably in an alternating manner in order to supply water jets successively to the various horizontal groups of pipes by closing and opening the orifices of said pipes one after the other, starting from the top.

Another member of the apparatus, a rotatable soft-cloth cleaning brush, serves the purpose of pre-cleaning, if necessary, certain dishes, pots or pans as well as forks

and knives before same are positioned in the general part of the apparatus.

Various further and more specific objects, features and advantages will clearly appear from the detailed description given below taken in connection with the accompanying drawings which form part of the specification and illustrate merely by way of example certain embodiments of the device of the invention.

The invention consists in the novel features, arrangements, and combinations of parts as may be shown and described in connection with the device herein disclosed by way of example only and as illustrative of certain preferred embodiments.

In the following description and in the claim, parts will be identified by specific names for convenience, but such names are intended to be as generic in their application to similar parts as the art will permit. Like references and characters denote like parts in the several figures of the drawings.

Referring now to the drawings:

Figure 1 is an external view of the closed apparatus;

Figure 2 is a front view without the doors showing the upper jets in action;

Figure 3 is a sectional view taken along the line A—A of Figure 2;

Figure 4 is a perspective view of a drawer for placing cups or glasses;

Figure 5 is a view of a drawer for forks and knives;

Figure 6 is a detail view of a drawer for forks and knives;

Figure 7 is an enlarged sectional view of the soft-cloth cleaning brush device;

Figure 8 is a partial side view of the drive of the groups of jet pipes;

Figure 9 is a plain view of the general drive arrangement;

Figure 10 is a view of a ratchet and pawl;

Figure 11 is a view of a cross section of the soft-cloth cleaning brush device;

Figure 12 is a view illustrating the cleaning means for cleaning a bottle.

Referring now more particularly to the drawings which illustrate by way of example a preferred embodiment of the invention, by which it may be realized and which gives satisfactory results, the sheet metal dishwashing apparatus **1** having an inclined front face comprises removable perforated drawers **2, 3, 4, 5, 6, 7** slidably arranged by means of semi-cylindrical shoes **8** gliding on bars **9** supported by brackets **10** fixed to the rear wall of the apparatus **1** (Fig. 3). The upper drawers **2, 3** are composed of metallic rods welded together at an angle of approximately 90°. The glasses **11** and cups **12** are arranged upside down in a favorable position for cleaning and rinsing. The drawers **4, 5, 6, 7** of Fig. 5 have slots inclined at an angle of approximately 30° which slots **17** are cut into metal strips **18** in order to support forks and knives **13, 14, 15, 16.** These objects rest therefore on two supports and only on their least sensitive parts, in order to facilitate the removal of food remnants by means of the water jets. Racks of known shape formed of steel rods (Figs. 2 and 3) fixed to supports **22, 23** carry dishes **19,** soup bowls **20** and saucers **21.** Supports **22** carry a soup-ladle **24** and a skimming ladle **25.** A series of levers **27** pivotally and coaxially mounted support sauce-pans **26,** arranged cascade-like one within the other to occupy a reduced space. Hooks (not visible in the drawings) carry the pans **28** which are nested in one another and are additionally supported by a stirrup **28'.** The pans and the sauce-pans are rinsed by groups of pipes **138, 139** (Fig. 2) specially inclined and attached to the lower conduits **77A** and **77B.**

The special member for efficiently cleaning of saucepans and pans comprises a profiled rotating brush 29 (Fig. 7), consisting of a soft plastic material or molded rubber or the like having protruding rubbing surfaces and receding surfaces to allow water to trickle along. Axial channels 30, 30' for the water are molded into the body and radial discharge channels are connected to the water passages 31, 31' (Fig. 11). A screw 32 molded into the body fixes the brush to its hollow shaft 33 by an end thread 34. At the lower end of the brush 29, a ring-shaped comb 35 consisting of rubber and perforated by radial channels 30'' is arranged to enable the cleaning of the tines of forks. The two last discs 37, strengthened by the metallic flange bushing 36, enables a convenient cleaning of knives. Said brush is rotatably mounted in an inclined positions by means of a flexible coupling 44 and rotates about its hollow shaft 33 in a supporting bearing 38. The carrier connection member 44 joins the shaft 33 to a hollow shaft 45 supported by a bracket 40 and mounted rotatably in a bushing 46 which is connected to a bushing 39. A pivotally mounted finger 41 permits to move said brush into another inclined position, for example symmetrically to the position illustrated in the drawing, and permits to fix it in said position by locking the lever 42 in the notch 43. A nozzle 127 may be screwed into the shaft 33 in place of the brush to facilitate the cleaning of bottles such as baby-feed bottles P (Fig. 12). The bushing 39 is extended by a bell-shaped member 47 wherein a compression spring 48 is located to exert pressure on a cutting means which comprises rotating knives 49 on top of a strainer 50 mounted above a discharge receptacle 51. By virtue of said spring 48 the knives can be lifted to pass over an obstacle. The knives are connected to the shaft 45 by a key 54 fixed to the shaft 45 which is rotated by miter gears 56 and 57, the latter being keyed to shaft 58 rotating in bearings 59 and 60. An electric motor 65 drives the shaft 58 by a worm 64 and wormwheel 63, and bevel gears 62 and 61 the latter being keyed to shaft 58. The assembly 45, 49 serves to disintegrate foodstuffs entrained by the rinse water.

Hot water is supplied to said brush 29 through the hollow shaft 45 and its rotating joint 66. This supply is controlled by the valve 67, by the inner member of which the switch 70 of the motor 65 is operated by way of a shaft 70', and ratchet 135 and pawl 136. Upon opening the valve 67 the motor 65 starts automatically and drives the brush 29. A part of the water passes through holes 137 to clean the rotating knives and to facilitate the removal of food remainders through strainer 50 into the discharge receptacle 51. The other part of the water passes through the brush 29 and trickles along it, thus wetting the item to be cleaned. The shutting of the valve 67 operates the ratchet 135 which has two teeth, fixed to the shaft 70'' of the switch 70, through the pawl 136 and crank 140 which is fixed to the shaft 70'. Upon turning valve 67 counterclockwise, the pawl 136 swivels around into a position 136' (Fig. 10) without operating the switch; therefore the motor 65 keeps running.

The pipes 77, 78, 79, 80, 81, 82 are angularly rotatably mounted by levers 77', 78', 79', 80', 81', 82', which are pulled by connecting means 83 and 84 preferably consisting of steel wire, under the control of a balancing lever 76, connected to a lever 74, and a crank 75 engaging lever 74 and mounted on shaft 73 driven by motor 71 over a speed reducing means 72 having a preferable speed of 30 to 40 revolutions per minute. Shaft 73 is supported by bracket and bearing 73A. The balancing lever 76 swings with an amplitude which determines the movement of the water jets emitted by pipes 77—82. A constant tension of the steel wires 83, 84 is maintained by a spring 85 fixed to the levers 86, 87. The pipes are pivotally mounted in pressure-tight joints having a flange member 78A (Fig. 9) in which the pipe 78 is rotatably arranged and which is kept in a bell-shaped member 78C.

The pipes are supported on their other side in bearings 77D and 78D. Sealing compounds may be used in the bell-shaped members 78B to prevent leakage. Vertical conduits 138 and 139 are fixed to the lower conduits 77A and 77B. Removable sheet metal guards R and O are arranged to protect the levers and distributing means.

A valve 89 is arranged to control the water flow through pipe line 88 leading to the pipes 77, 78, 79, 80, 81, 82, which in turn operates the switch 90 of the motor 71.

The distribution of water to the pipes 77, 78, 79, 80, 81, 82 is effected successively by the vertical movement of the vertical distributing pipe 96 (Fig. 8), the shaft 95 of which is moved by a rod 94 and a crank 93 fixed to the shaft 92 (Fig. 9) by means a reducing gear 91 coupled to the motor 71. Shaft 92 rotates with 3 to 5 revolutions per minute for example. The water flowing through pipe line 88 passes into a chamber 97 (Fig. 8) and passes through holes 98 drilled into the tube 96, thence flows under high pressure through openings 99, 100, 99', 100', 99'', 100'' which are opened at the entrance of the pipes 79, 80, 81, 82. The latter pipes have a plurality of holes or slots 105 drilled on inclined planes and arranged in a plurality of rows below and above the horizontal axis of these pipes.

On the downward stroke of the distributing means, the openings 99, 100 are closed and the corresponding pipes 81, 82 are shut off whereas the pipes 77, 78 are supplied through openings 99A and 100A which are opened by the downward movement. When the crank 93 has passed over its lower dead center, the distributing means 96 moves upwardly again to provide for a distribution of rinsing water in the opposite sequence of closing and opening the supply of water to the groups of pipes.

The cylinder 97 of the distributing means 96 comprises a valve-piston 106' having a spring 106' and having a check valve 107 at its lower end. A container 110 for detergents having a funnel 111 is connected by a pipe line 108 having a valve 109 to said cylinder 97. A hole 112 is provided in the piston 106 to allow the detergent to mix with the water when the piston 106 pushed by the rod 94 moves upwardly and sucks the detergent in by its first stroke. A limit switch 115 having a timing device is operated by a cam 116 keyed to shaft 92 and a push button 115A when the crank 93 arrives at its upper dead center. The switch 115 comprises an automatic resetting device, known per se, which at the end of the drying cycle serves to restore the electric circuit for the switches 70 and 90, whereby the motors 65 and 71 are stopped. The timing device 115 is set to keep the motor 65 running for a short time after stopping the motor 71. A ventilator 52 is arranged in a manner to evacuate the steam from the apparatus and to create a certain vacuum to dry the dishes completely. A manually operated control member 53 is positioned in the suction pipe 55 of the ventilator. In order to insure this operation, tight fitting doors 122, 123 are provided and are equipped with tight fitting rubber gaskets 119 all around and with metallic strips 120 fixed by screws 121, 121' which, together with sealing strips 122A and 123A, constitute hinges offering a certain resistance against closure of the doors. The doors 122, 123 have also center strips 124, 125 which are compressed enough when closing the doors by gravity to prevent air from entering from the outside into the apparatus in spite of the absence of bars or locking devices.

The lower part of the housing of the apparatus 1 consists in a trough 126, the bottom of which is inclined toward the strainer 50, in order to hold some amount of clean water for other items to be cleaned such as bottles or the like. A work table 128 is provided within the doors 122, 123 and hinged to be swung outwardly. Brackets 129 fixed to the doors 122, 123 are arranged to support the work table in its lowered position.

A stand-pipe 126A is arranged to keep the water within the trough from overflowing when the operator has the brush swung outwardly in order to clean bottles or the

like. The stand-pipe 126A is connected to a drain conduit 52' of the ventilator 52 and to the discharge pipe 52B fixed by a flange 142' and bolts 142 to the bottom of the housing B. The stand-pipe 126A serves at the same time as an air trap during the drying cycle of the apparatus.

An inclined piece of sheet metal C supported by the cross-braces D (shown schematically) which support the motors and various mechanism of the apparatus, arranged at the bottom of the base B, is provided to collect the inevitable amount of leakage inherent in all hydraulic machinery. A suction pipe 130 is built-in which is connected to an auxiliary turbine wheel 131 (Fig. 7) fixed to the wheel of the ventilator 52 but separated from it by a partition wall 52'' within housing 52P. If there is no waste water in the base, the turbine wheel 131 evacuates the steam from the lower housing and constantly keeps dry the base B of the apparatus 1 which contains the motors and the electrical equipment.

A gutter 132 is arranged in front of the apparatus 1 and below the doors 122, 123 to collect all water which could escape from said doors, and orifices 133, 134 are provided to lead such water into the waste water sump formed by the sheet metal C within said base B.

While the invention has been described with respect to a certain particular preferred example which gives satisfactory results, it will be understood by those skilled in the art, after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claim to cover all such changes and modifications.

What I claim, is:

A method of automatically washing dishes or like articles which comprises the steps of placing said articles in stacks on a plurality of superposed, perforated racks enabling drainage of water therefrom, causing hot water to flow intermittently in at least three tiers of substantially horizontal streams immediately above, between and below all of said stacks over substantially the entire length of said racks, so controlling said streams that a flow exists at successive intervals in progressively lower tiers, directing water from streams between said racks in simultaneous ascending and descending jets upon the adjacent stacks, said jets being parallel and uniformly spaced throughout the length of said racks, and oscillating said jets back and forth across said articles.

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