Oct. 24, 1939. J. D. LEWIS 2,177,219

DISHWASHING AND STERILIZING MACHINE

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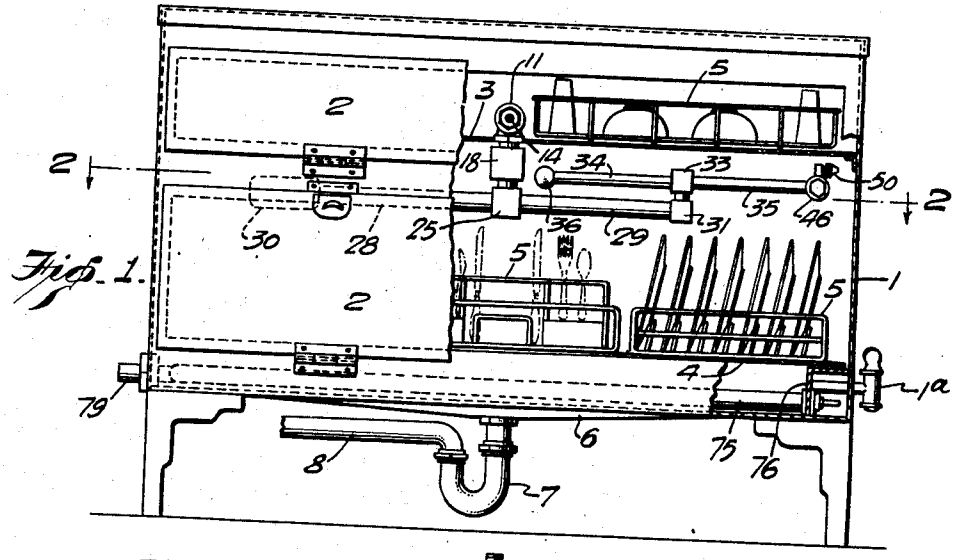


Fig. 1.

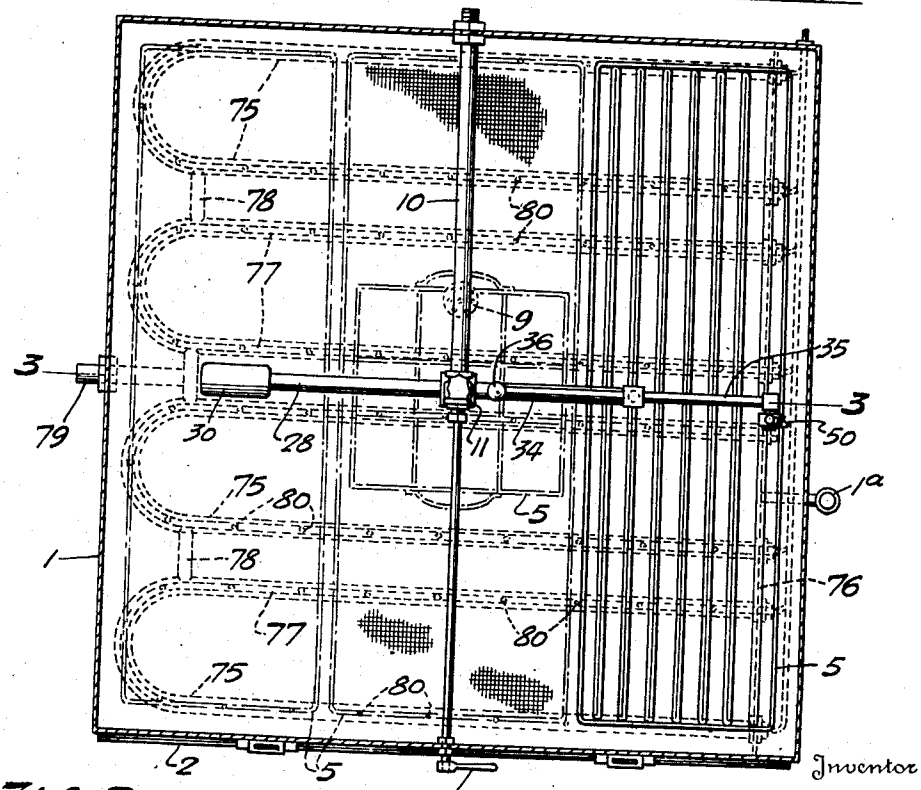


Fig. 2.

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Oct. 24, 1939. J. D. LEWIS 2,177,219

DISHWASHING AND STERILIZING MACHINE

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Fig. 3.

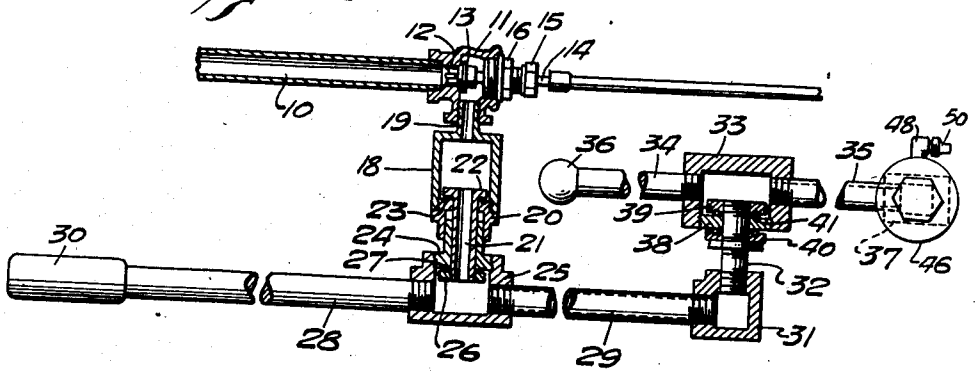


Fig. 4.

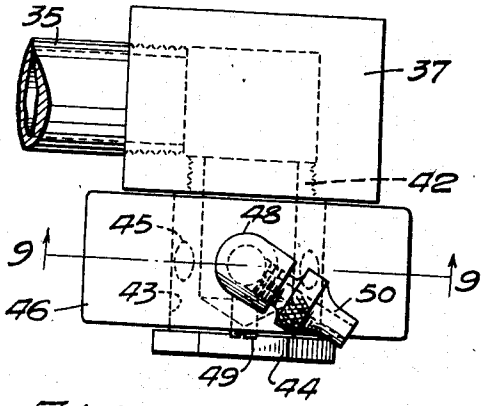


Fig. 5.

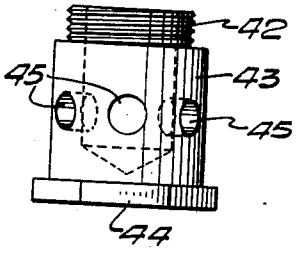


Fig. 6.

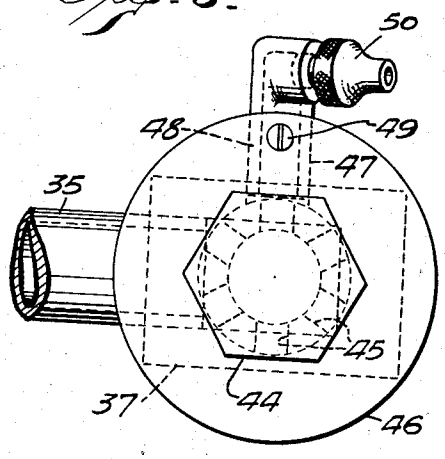


Fig. 7.

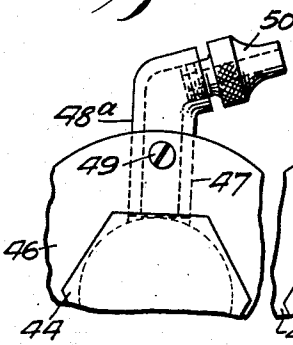
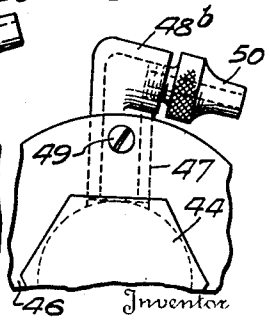


Fig. 8.



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Oct. 24, 1939. J. D. LEWIS 2,177,219

DISHWASHING AND STERILIZING MACHINE

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Fig. 9.

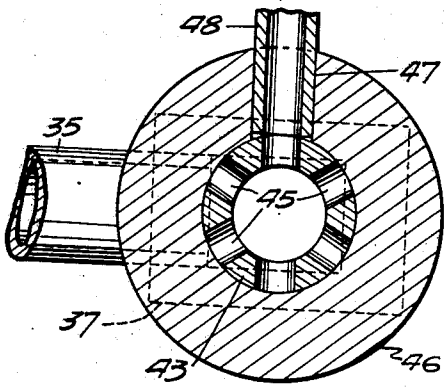


Fig. 10.

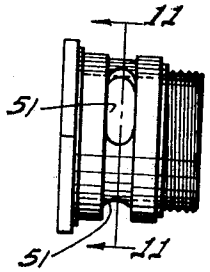
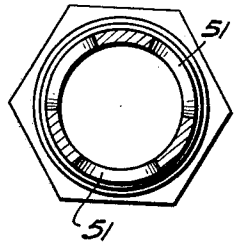


Fig. 11.



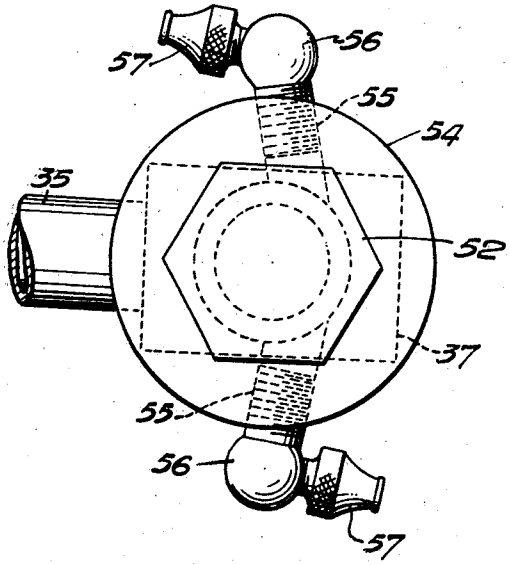
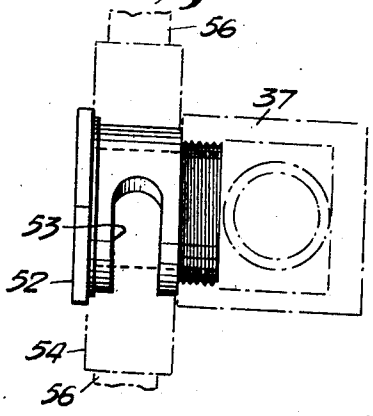


Fig. 12.

Fig. 13.



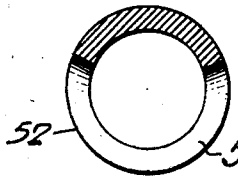


Fig. 14.

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Oct. 24, 1939. J. D. LEWIS 2,177,219

DISHWASHING AND STERILIZING MACHINE

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Fig. 15.

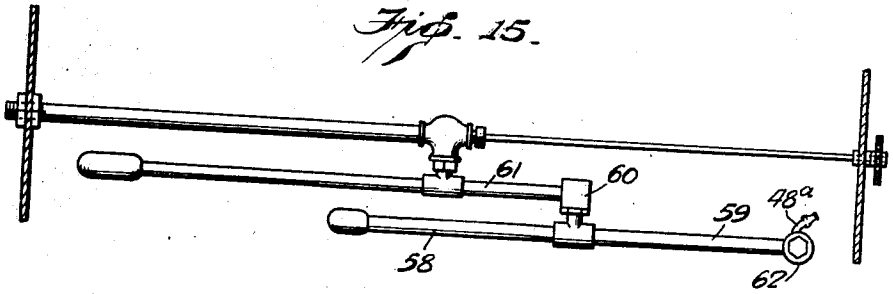


Fig. 16.

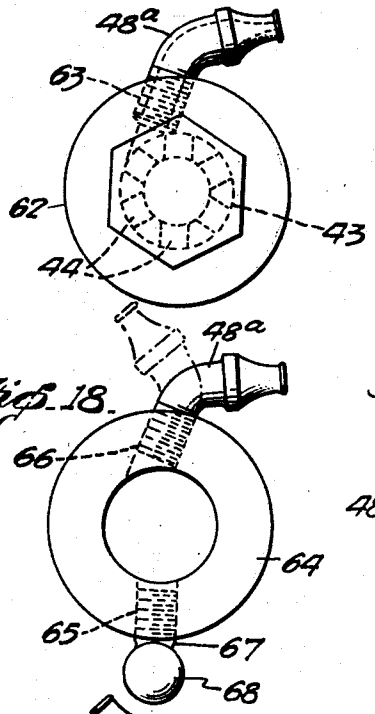


Fig. 17.

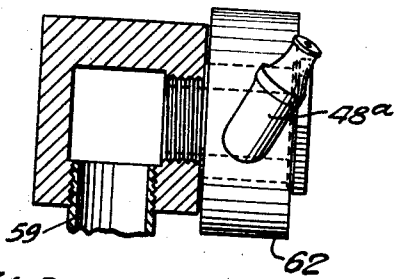


Fig. 18.

Fig. 19.

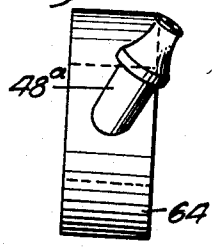


Fig. 20.

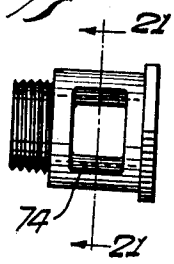


Fig. 22.

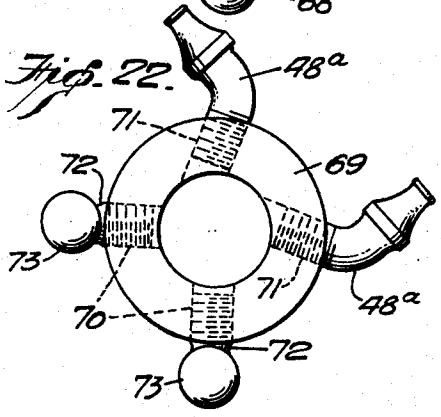
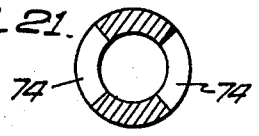


Fig. 21.



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Patented Oct. 24, 1939 2,177,219

UNITED STATES PATENT OFFICE

2,177,219

DISHWASHING AND STERILIZING MACHINE

Joseph D. Lewis, Santa Barbara, Calif.

Application August 20, 1937, Serial No. 160,160

8 Claims. (Cl. 299—69)

The invention relates to apparatus for cleansing dishes and/or utensils of all sorts and has for its general object the provision of a novel machine by means of which such objects or articles may be washed, rinsed, sterilized and dried, it being, moreover, a feature that the device is equally capable of use as a dish and food warmer.

An important object of the invention is to provide a machine of this character in which the washing and rinsing are effected simply by the power derived from the pressure of or in the household water system, it being consequently unnecessary to provide any motor driven pump for the purpose of distributing the water onto the dishes and/or other articles.

What might be called the primary object of the invention is to provide a dishwashing machine in which the water distributing means comprises the combination of a reaction operated relatively slowly rotating main water supply or distributing arm, or a plurality thereof, an auxiliary faster rotating arm and relatively rapidly rotating or whirling spray nozzles carried thereby and likewise reaction operated, the combination of movements of the arms and nozzles resulting in a thorough and most efficient application of the water, in the form of jets or fine streams in contradistinction to a spray, onto or against the various objects to be cleansed, it being moreover a feature to provide one or more discharge tips of a selected size and adjustable as to position or direction of discharge for the purpose of regulating the rotating speeds of the distributing arms and the nozzles to insure maximum efficiency to be derived from the pressure in the available water supply system.

Another object of the invention is to provide a water distributing system wherein the construction of the whirling nozzles may be such that the successive spurts of water therefrom may be of longer or shorter duration and in which the construction may be such as to direct the water upwardly alone or downwardly alone depending upon the relationship between the water distributing means and the article holding trays or shelves, in addition to its being a feature that the water may be caused to pass upwardly and downwardly as is of course necessary when the distributing means is located between vertically spaced trays or shelves.

A further object of the invention is to provide a machine of this character in which the utensils cleansed may be sterilized by means of steam which may be saturated and which may, if desired, be superheated so that the most efficient temperature may be reached for the destruction of bacteria, the actual arrangement and construction of the sterilizing device being capable of variation or modification depending upon preference.

An additional object is to provide a machine for this purpose which will be simple and inexpensive to manufacture and assemble, easy to operate, positive in action, efficient and durable in service, and a general improvement in the art.

To the attainment of the foregoing and other objects and advantages, which will hereinafter become apparent, the invention preferably consists in the details of construction and the arrangement and combination of elements or parts to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings in which:

Figure 1 is a front elevation of a machine constructed in accordance with my invention, parts being broken away and in section to disclose the interior structure,

Figure 2 is a horizontal sectional view taken on substantially the line 2—2 of Figure 1,

Figure 3 is a view of the water distributing mechanism taken on substantially the line 3—3 of Figure 2, all parts of the machine other than the water distributing mechanism being omitted,

Figure 4 is an enlarged top plan view of the end of the auxiliary water distributing arm and the whirling nozzle carried thereby,

Figure 5 is a side elevation of the trunnion element about which the nozzle rotates or whirls,

Figure 6 is a front elevation of what is shown in Figure 4,

Figures 7 and 8 are fragmentary views similar to Figure 6 showing different angularly shaped nozzle tips,

Figure 9 is a detail cross section taken on the line 9—9 of Figure 4 with the nozzle tip broken away or omitted,

Figure 10 is a side elevation of a modified form of trunnion member for the nozzle constructed to provide spurts of relatively long duration,

Figure 11 is a detail cross section taken on the line 11—11 of Figure 10,

Figure 12 is a view similar to Figure 9 showing a pair of discharge tips for the nozzle and showing a modified trunnion member capable of disposition to cause the jets or spurts of water to be projected either upwardly or downwardly as preferred,

Figure 13 is a side elevation of the trunnion member shown in Figure 12, the remainder of the nozzle and the end of the auxiliary distributing arm being shown in dot and dash lines,

Figure 14 is a cross-section through the trunnion member of Figures 12 and 13,

Figure 15 is a side elevation of a water distributing system of a somewhat modified form, fragments of the machine casing being shown in section,

Figure 16 is a front elevation of another modified form of whirling nozzle,

Figure 17 is a view partly in section and partly in plan illustrating this modified nozzle,

Figure 18 is an elevation of a type of nozzle similar to that shown in Figure 16 but constructed to permit the use of a pair of tips,

Figure 19 is a plan view thereof,

Figure 20 is a side elevation of another form of trunnion member having but two ports,

Figure 21 is a detail cross section taken on the line 21—21 of Figure 20,

Figure 22 is an elevation of a nozzle of the same general type as that disclosed in Figures 16 and 18 but constructed to permit the use of as many as four tips.

Referring more particularly to the drawings I have shown my machine as comprising a suitable casing 1 of any desired size or shape and of any preferred or appropriate finish, the casing being formed with door openings normally closed by hinged doors 2 equipped with the usual fastening devices. Mounted within the casing are vertically spaced perforated or foraminous shelves 3 and 4 upon which are disposed the racks or baskets 5 containing the dishes, utensils or any other objects to be washed, sterilized and dried. The bottom 6 of the casing is inclined toward a water outlet which is represented as in the form of a P-trap 7 connected with a waste pipe 8. It is preferable that a screen or perforated member 9 be provided at the entrance end to the trap for the purpose of preventing any relatively large fragments of food or other material from passing into and possibly clogging the trap. The casing should be equipped with a thermostatic valve 1a to permit the outlet of cold air from the chamber so that its presence will not retard the inflow of water and so that steam pressure can be satisfactorily generated.

The water distribution system for supplying water onto and against the dishes or other objects to be cleansed, comprises a suitably mounted inlet or supply pipe 10 entering the casing and carrying a valve structure formed as a body 11 having a valve seat 12 therein adapted to be closed by a valve 13 carried by a stem or rod 14 which passes through a packing gland 15 screwed into a plug 16 closing the end of the valve body, the rod being journaled through the front of the casing and having its projecting outer end equipped with a handle 17 by means of which the rod may be turned for unseating or seating the valve 13, there being provided any conventional sort of preferably steep thread within the plug so that upon rotation of the rod it and the valve will be moved longitudinally.

Depending from the valve body 11 is a cylindrical shell 18, which is provided with a reduced threaded extension 19 at the upper end thereof screwed into the lower part of the valve body for securing the shell 18 to the valve body 11. The lower end of the shell 18 is closed by a plug 20 screwed into place and through which is journaled a tubular stem 21 having an outstanding flange 22 engaging upon bearing balls 23 seated in a race at the top of the plug 20. This hollow or tubular stem 21 extends through a plug 24 screwed into the upper end of a T 25 and carries a collar 26 upon which are mounted bearing balls 27 seated in a race at the underside of the plug 24. Screwed into the opposite branches of the T 25 are pipes 28 and 29, the former of which is closed at its outer end and carries a weight 30 and the latter of which is screwed into a fitting 31 from which rises a tubular or hollow stem 32 swivelly connected with a fitting 33 of T-form from the opposite branches of which extend pipes 34 and 35, the former of which is closed at its outer end and equipped with a weight 36 and the latter of which has its free end screwed into a fitting 37. While the swivel connection between the pipe 32 and the T 33 might be varied, the construction herein disclosed comprises a plug 38 screwed into the lower branch of the T 33 and apertured for rotatably receiving the pipe, the latter carrying collars 39 and 40 between which and the plug 38 are interposed bearing balls 41.

It is possible to make use of different spray or jet devices as will be explained, but in one form of the invention I have disclosed the fitting 37 as having screwed thereinto a reduced extension 42 on a circular or cylindrical body member 43 of hollow formation having an angular head 44 and provided with a plurality of radially extending ports or outlet openings 45. Surrounding the body member 43 and confined between a face of the fitting and the angular head 44 is a rotatable shell 46 of cylindrical form having a radial port 47 within which is located a tubular stem 48 of angular formation and which may be right angular as shown in Figure 6, of obtuse angle form as shown at 48a in Figure 7 or acute angle shape as shown at 48b in Figure 8. The stem 48 is rotatably adjustable within the port or passage 47 so as to vary the reaction effect and is secured in an adjusted position simply by screwing it into place or holding it by means of a grub or other set screw 49. The different modes of holding are shown in different figures of the drawings. Secured to the outer end of this tubular stem 48a or 48b, as the case may be, is a nozzle 50 which constitutes the outlet for water.

In so far as the water discharge means is concerned, it will be seen that when water is introduced through the inlet pipe 10 and the valve 13 is unseated by turning the handle 17, the water will pass through the valve seat 12, reduced extension 19, shell 18, stem 21, T 25, pipe 29, fitting 31, stem 32, T fitting 33, pipe 35, fitting 37, reduced extension 42, body 43, ports 45, hollow stem 48, and nozzle or jet 50. Clearly the reaction will cause the shell 46 to rotate about the body 43, and as the hollow stem 48 registers with the successive ports 45, there will be a succession of spurts of water which will impinge against the dishes or other objects in the upper and lower racks 5, thereby effectually cleansing the objects. At the same time, owing to the fact that the longitudinal axis of the nozzle or jet 50 is at an angle with respect to the transverse axis of the shell a reactionary effect will be exerted upon the pipe 35 and as this pipe is carried by the T 33 which is swivelly connected with the stem 32 both of the pipes 34 and 35 will rotate as a unit. Moreover, the reactionary force will cause the pipes 28 and 29 and T 25 carrying the same, together with the stem 21, to rotate with respect to the shell 18. On account of this action it should be apparent that all surfaces of the dishes or other objects will be exposed to the cleansing effect of the successive spurts of water issuing from the nozzle 50.

If the ports 45 be of circular or cylindrical shape as shown in Figures 5, 6 and 9 the spurts will be frequent but of comparatively short duration. If it is desired to have fewer spurts of longer duration recourse may be had to the construction shown in Figures 10 and 11 wherein there are disclosed but three ports 51 corresponding to the ports 45 but of elongated shape. The action is of course the same in other respects.

In some constructions of dishwashing machines it is conceivable that there may be but one article supporting shelf and in such case it is apparent that it would be necessary to have the spurts of water in only an upward or a downward direction instead of both. In such an instance the previously described body member 43 could be replaced by a body member 52 of similar form except that there would need to be only one port 53 therein, extending throughout preferably five-ninths of the periphery or circumference. The spurts of water would therefore be directed downwardly only if the body 52 be arranged as in Figure 12, or only upwardly if the body be inverted with respect to what is shown in Figure 12. Moreover, it is not necessary to limit the number of nozzles or jets to one and in Figure 12 I have shown the shell 54, corresponding to the previously described shell 46, as formed with two radial ports or passages 55 within each of which is rotatably adjustably secured a stem 56 carrying a nozzle 57.

Figure 1 shows the rotatable pipes 34 and 35 as mounted above the pipe 29. The invention is not limited to this arrangement as a reversal may be resorted to as shown in Figure 15 wherein the pipes 58 and 59 corresponding to the pipes 34 and 35 are swivelly supported beneath a fitting 60 carried by a pipe 61 corresponding to the pipe 29 and swiveled beneath the water inlet control valve.

Another variation in the nozzle construction over what has previously been described, is that the outlet, one or more, need not be radial with respect to the shell as shown in Figures 4 to 12 but may be tangential with respect to the stationary cylindrical body member about which the shell revolves. Figure 16 shows a shell 62 rotatable about a body member 43 having a plurality of ports 44 therein, but the passage or port 63 within which the outlet stem is mounted is tangential though the same in every other respect as the previously described outlet stems 48, 48^a, 48^b or 56 and adjustably secured in identically the same manner so as to vary the reaction force.

Figures 18 and 19 show another modification wherein the rotary shell 64 is formed with a radial port or passage 65, as in Figures 6 to 12, and a tangential port or passage 66, the idea being that the outlet stem carrying the nozzle may be located within either, the one not in use being closed by a plug 67 preferably carrying a weight 68 designed to counterbalance the weight of the outlet stem and nozzle so as to insure smooth rotation free from excessive vibration.

The only difference between what is shown in Figure 22 and Figures 18 and 19 is that in the former the shell 69 is represented as provided with two radial ports or passages 70 and two ports or passages 71 tangential to the central relatively stationary port, this figure moreover showing both of the tangential ports or passages equipped with nozzle carrying outlet stems 48^a of obtuse angular form and the ports or passages 70 being shown as occupied by plugs 72 with counterbalancing weights 73 exactly as in Figure 18. By such an arrangement it is clear that there will be double the number of spurts of water. Obviously, if such is desired, the outlet nozzles could be mounted in the ports or passages 70 and the ports or passages 71 be closed by shifting the counterbalanced plugs 72.

Another point to be mentioned in passing is that the relatively stationary body member which serves as the trunnion for the rotary shell may be formed simply with a pair of elongated ports 74 as shown in Figures 20 and 21 instead of the plurality illustrated for instance in Figures 5, 6, 9, 10, 11, and 16.

Regardless of whether the nozzle, and the pipe upon which it is mounted, is below or above the main water outlet pipe, it will be seen that the reactionary force will not only cause rotation of the nozzle itself or the shell upon which it is mounted but will also cause rotation of what might be called the auxiliary pipes as well as the main pipes. In a great many dishwashing machines there is a spray action whereas with the present device the water is ejected in what might be called the form of a wheel, there being simply successive spurts upwardly and downwardly in case the machine has vertically spaced article supporting trays between which the nozzle is located, or only upwardly or downwardly in case the machine has simply an upper tray or a lower tray.

Regardless of the details of whatever nozzle mechanism may be provided, it is a distinct feature of importance to provide for sterilization of whatever objects, such as dishes, silverware or the like, are cleansed. To accomplish sterilization, it is obviously necessary to develop a considerable degree of heat within the machine and to provide means whereby this heat will be adequately distributed.

In Figures 1 and 2 I have disclosed the sterilizing means as comprising a plurality of U-shaped tubes or pipes 75 which have their ends communicating and connected with a header 76, these tubes or pipes containing resistance elements 77 which might conceivably be of the type disclosed in the Abbott Patent No. 1,367,341 though possibly of a different variety inasmuch as this detail is not considered to be an essential feature of the invention. The U-shaped pipe members 75 are shown as connected near their bight portions by transverse tubes or pipes 78 so that there will be a complete circulation of water throughout all of them. While it is possible to supply water to this sterilizing means by the structure disclosed in my Patent 2,127,778 for Dishwashing and sterilizing machines, granted August 23, 1938, such is not really necessary as in the present instance I have shown a separate water inlet pipe 79 leading from any suitable or appropriate source of supply and connected with one of the transverse tubes or pipes 78. It should of course be mentioned that the U-shaped pipes 75 are perforated as at 80 so that when the resistance units 77 within the pipes perform their function and steam is generated, such steam will issue from the perforations 80 in the U-shaped pipes and effect a sterilizing action upon whatever objects are within the machine.

Regardless of whatever sterilizing means is provided, it is obvious that there must be provided an outlet for the water used in cleansing the dishes or other objects. In view of this,

I have found that it is sufficient to provide the P-trap 7 previously described. This will permit the development of a sufficiently high steam pressure within the casing of the machine and, consequently, a sufficiently high temperature to kill any bacteria which may be present upon the articles to be cleansed.

After sterilization has been effected, it is clear that the continued passage of current through the resistance elements, after the water within the pipes 75 and 78 has been exhausted or dispersed in the form of steam, the continued heat will operate to dry the dishes or other objects within the racks 5.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided a combined dishwashing and sterilizing machine which will in every respect perform the functions for which it is intended. It will be observed that there is always a wheel-like spurt action in contradistinction to a spray such as is provided in many machines for the general purpose. It is believed that the succession of spurts in a substantially vertical plane impinging against the dishes, glasses, silver-ware or other objects supported upon the one or more trays will act to effect a superior cleansing action in a shorter time than is the case with the ordinary type of machine.

In so far as the specific description is concerned, it is thought that the foregoing should make the invention perfectly clear to one skilled in the art without any further amplification or explanation.

While I have shown and described the preferred embodiments of the invention, it should be understood that the disclosure is merely an exemplification of the principles involved as the right is reserved to make all such changes in the details of construction as will widen the field of utility and increase the adaptability of the device provided such changes constitute no departure from the spirit of the invention or the scope of the claims hereunto appended.

Having thus described the invention, I claim:

1. For use in a dishwashing machine of the type involving a cabinet and means within the cabinet for supporting articles to be cleansed, the combination of a water inlet pipe, a main water arm swivelly connected with said inlet pipe, an auxiliary water arm swivelly connected with said main water arm and a discharge member carried by said auxiliary arm being reaction operated to rotate with respect to said auxiliary arm.

2. For use in a dishwashing machine involving a cabinet and means within the cabinet for supporting articles to be cleansed, the combination of a water supply pipe, a main arm swivelly connected with said inlet pipe, an auxiliary water arm swivelly connected with said main water arm, a rotary reaction operated member carried by said auxiliary arm and comprising a relatively fixed, radially ported head secured to the auxiliary arm, a ported shell rotatable about said head, and an angular nozzle-carrying member carried by said shell.

3. For use in a dishwashing machine of a type involving a cabinet and means within the cabinet for supporting articles to be cleansed, the combination of a water inlet pipe, a main water arm swivelly connected with said inlet pipe, an auxiliary water arm swivelly connected with said main water arm, a rotary member carried by said auxiliary arm and comprising a relatively fixed, radially ported head secured to the auxiliary arm, a ported shell supported by and rotatable about said head, and nozzle-carrying members carried by said shell, said nozzle-carrying members being of selective angularity.

4. For use in a dishwashing machine of a type involving a cabinet and means within the cabinet for supporting articles to be cleansed, the combination of a water inlet pipe, a main water arm swivelly connected with said inlet pipe, an auxiliary water arm swivelly connected with said main water arm, a rotary reaction operated member carried by said auxiliary arm and comprising a relatively fixed, radially ported head secured to the auxiliary arm, a ported shell rotatable about said head, an angular nozzle-carrying member carried by said head; the angularity of said nozzle-carrying member being adjustable to vary the reactionary force of spurts issuing therefrom.

5. For use in a dishwashing machine of a type involving a cabinet containing means for supporting objects to be cleansed, the combination of a stationary water inlet pipe, a horizontally rotatable main pipe swivelly connected with said first named pipe, an auxiliary or subordinate substantially horizontally rotatable pipe swivelly connected with one end of said first named pipe, a fitting carried by one end of said auxiliary pipe formed with a plurality of ports, and a nozzle device carried by said auxiliary pipe at the ported end thereof and rotatable in a vertical plane.

6. For use in a dishwashing machine of a type involving a cabinet containing means for supporting objects to be cleansed, the combination of a stationary water inlet pipe, a horizontally rotatable main pipe swivelly connected with said first named pipe, an auxiliary or subordinate substantially horizontally rotatable pipe swivelly connected with one end of said first named pipe, a fitting carried by one end of said auxiliary pipe formed with a plurality of ports, and a nozzle device carried by said auxiliary pipe at the ported end thereof and rotatable in a vertical plane, said nozzle device including a ported shell, an outlet stem and a nozzle carried by the latter.

7. For use in a dishwashing machine of a type involving a cabinet containing means for supporting objects to be cleansed, the combination of a stationary water inlet pipe, a horizontally rotatable main pipe swivelly connected with said first named pipe, an auxiliary or subordinate substantially horizontally rotatable pipe swivelly connected with one end of said first named pipe, a fitting carried by one end of said auxiliary pipe formed with a plurality of ports, a nozzle device carried by said auxiliary pipe at the ported end thereof and rotatable in a vertical plane, said nozzle device including a ported shell, an outlet stem and a nozzle carried by the latter, said stem being rotatably adjustable with respect to the shell, and means for maintaining said stem in a predetermined position.

8. For use in a dishwashing machine of a type involving a casing and means within the casing for supporting objects to be cleansed, the combination of a water inlet pipe, a main water distributing pipe revolubly connected with said inlet pipe, an auxiliary or subordinate water distributing pipe revolubly connected with said main distributing pipe, both of said pipes being rotatable in a horizontal plane, and a nozzle carried by said auxiliary pipe; said nozzle being reaction operated to rotate in a vertical plane.

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