

April 27, 1954

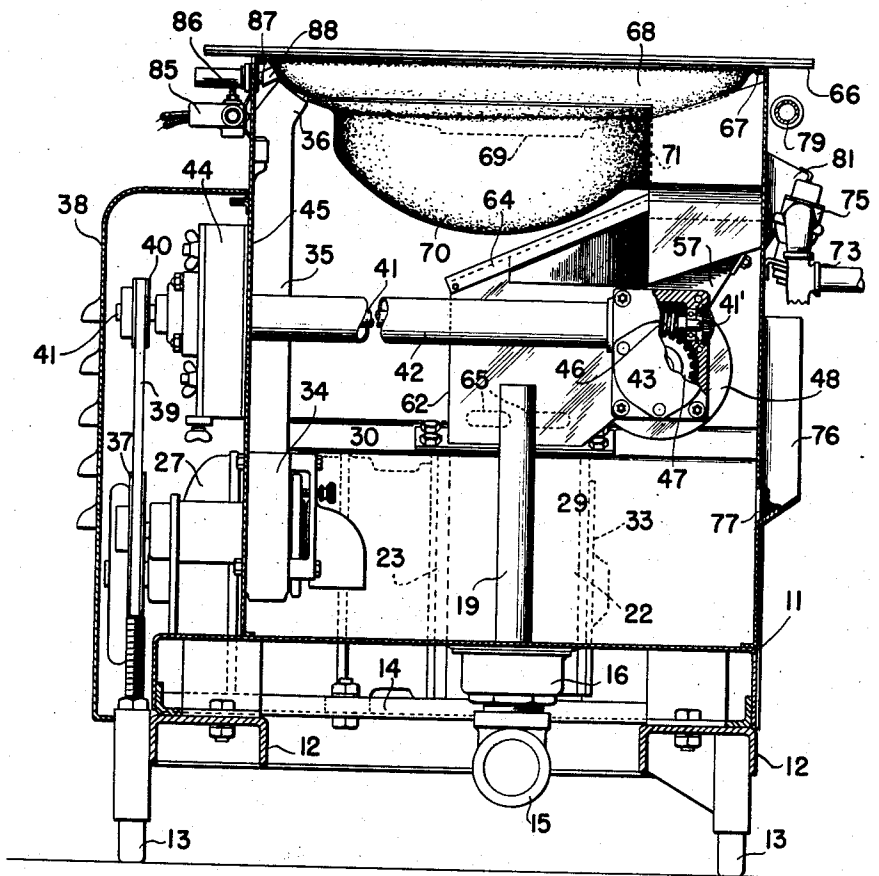
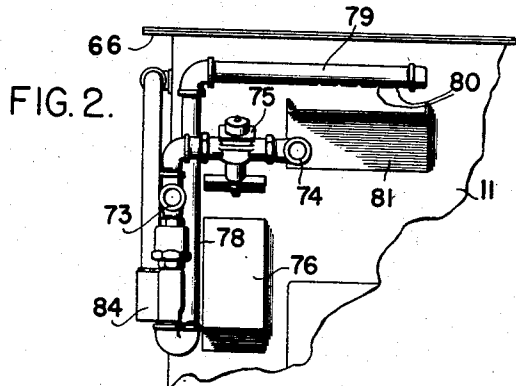
R. W. STREHLOW
APPARATUS FOR RINSING DISHES AND SILVERWARE
AND DISPOSING OF TABLE SCRAPS

2,676,759

Filed July 24, 1950

4 Sheets-Sheet 1

FIG. 1.



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FIG. 3.

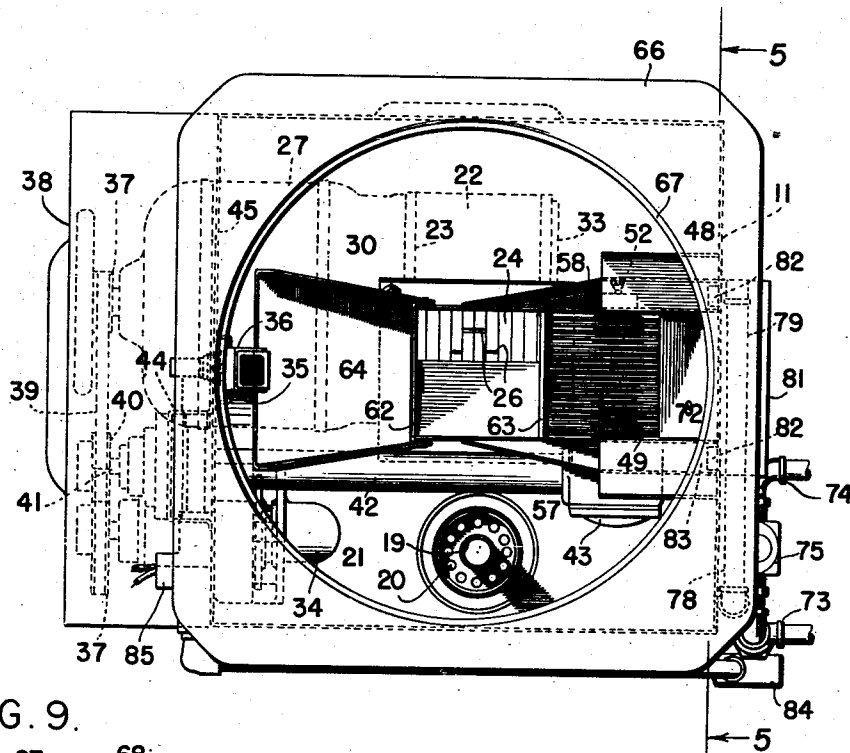


FIG. 9.

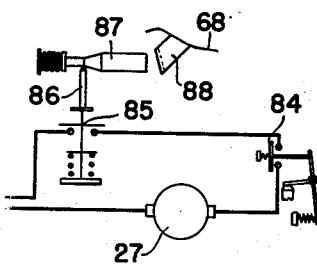


FIG. 8.

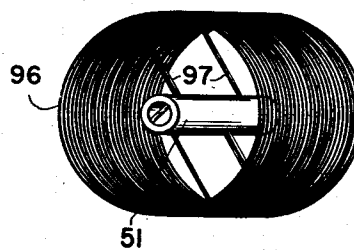
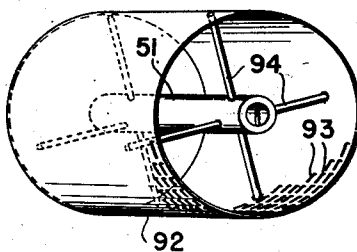


FIG. 7.



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FIG. 4.

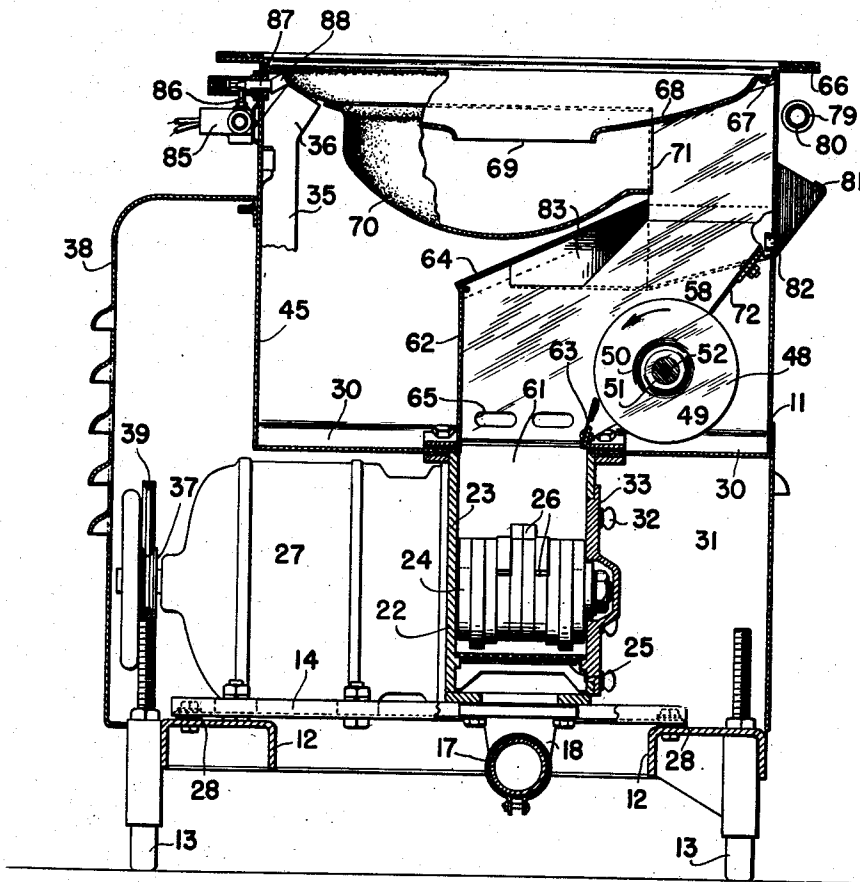
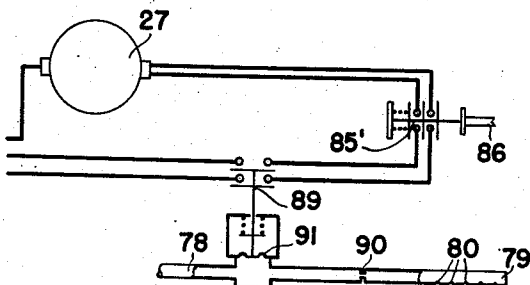


FIG. 10.



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FIG. 5.

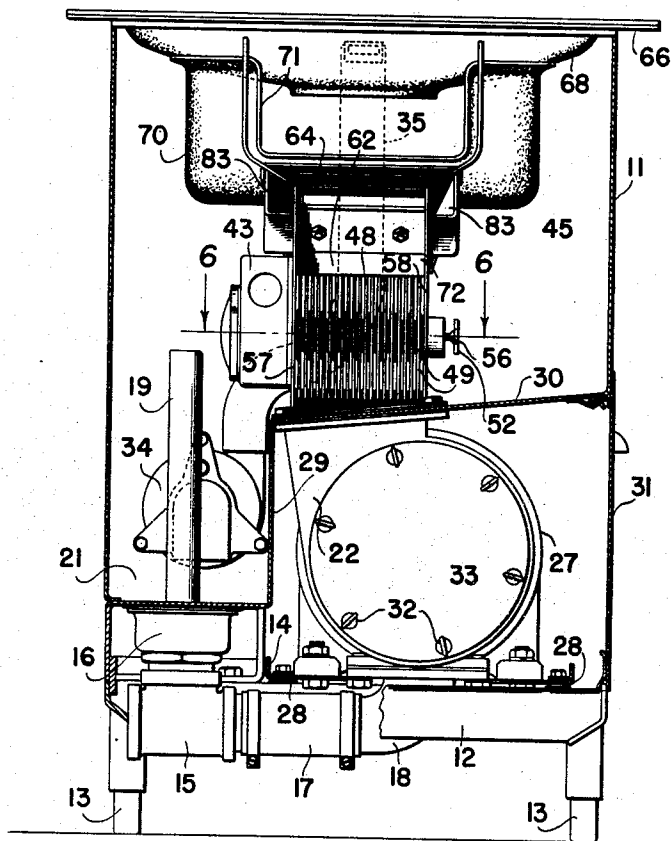
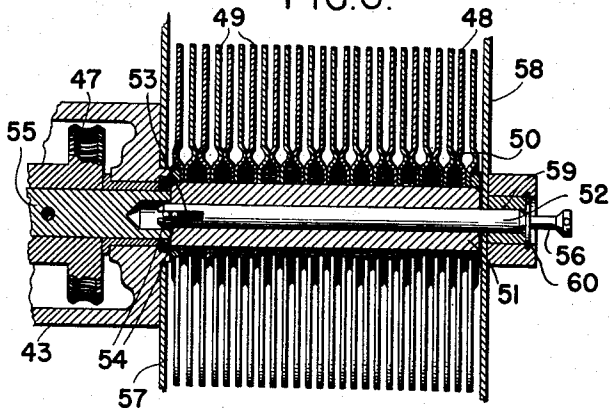


FIG. 6.



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UNITED STATES PATENT OFFICE

2,676,759

APPARATUS FOR RINSING DISHES AND SILVERWARE AND DISPOSING OF TABLE SCRAPS

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corporation of Wisconsin

Application July 24, 1950, Serial No. 175,643

6 Claims. (Cl. 241—32.5)

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This invention relates to a machine which discharges a column of water in a manner which will flood and rinse table scraps from dishes placed in its path, which will direct the table scraps to a grinder communicating with the drain, and which will recirculate the bulk of the rinsing water for rinsing purposes.

This invention is an improvement on the invention set forth in the copending application of Robert W. Strehlow, Albert M. Olson and Lawrence E. Kaap and myself, Serial No. 124,156, filed October 28, 1949, now Patent 2,593,359 issued April 15, 1952, and entitled Table Scrap Eliminating Device.

In that application, a machine is provided for restaurants and the like which contains a reservoir or tank near its base into which fresh water of the desired temperature for rinsing purposes is introduced. Water from this reservoir is pumped up a gusher tube and discharged in the form of an arching stream onto a basin disposed at the top of the cabinet. Dishes or silverware are manually held or passed over the basin so that the stream of water floods them on its descent. The water and the table scraps are caught in the basin and pass through an opening to a mechanism which is termed a separator.

The separator shown in our prior application was an inclined, reciprocating rack consisting of bars spaced apart a slight distance so that water could flow between them. All but the smallest table scraps were held on the bars and the motion of the bars urged these scraps down the incline and into the grinder feed chute. Since the rack was disposed directly above the tank or reservoir, water passing between the bars fell directly into the tank where it could be recirculated through the pump and the gusher tube.

Slots were provided in the grinder feed chute on a side of the latter adjacent the reservoir and excess water (equal to the make-up water constantly being supplied to the reservoir less such water as inadvertently passed with the table scraps to the grinder) would flow from the reservoir through these slots, thereby providing the necessary water to assist in grinding. The latter water also served to flush the drain to which the discharge side of the grinder was connected.

The present invention provides an improved separator for separating the table scraps from the water which is to be recirculated. The present separator having rotary motion supports the scraps and effectively transfers them to the grinder. At the same time it allows the water to pass through it and is not apt to become

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clogged with scrap particles. Fewer particles can pass through the separator than with the reciprocating type, and there is less possibility of clogging the pump that recirculates the rinsing water.

Another advantage of the present separator is the ease with which it can be disassembled and cleaned at the end of a rinsing and grinding operation.

According to the present invention there is also provided means for insuring that a more adequate supply of water is at all times available to the grinder so that ground particles leaving the grinder may be properly flushed through the drain into the sewer pipe.

It has been found that the quantity of warm water introduced into the reservoir may be reduced and the cost of operation lessened if an auxiliary supply of cold water is introduced directly into the grinder. The provision of an auxiliary supply of water, which is one of the features of the present invention, has these advantages:

First, it makes possible the operation of the grinder almost immediately after water is introduced into the reservoir. With our former system, in order that the grinder was not operated until water was flowing into it, it was necessary to wait until the reservoir was filled with water. Because of the relatively small quantity of make-up water used, this time delay was quite a disadvantage.

Second, conservation of warm water results from reducing the quantity of warm water introduced into the system to an absolute minimum consistent with the necessity of maintaining the desired temperature for rinsing purposes and overflowing just sufficient contaminated water to maintain the recirculated water relatively clear. This required quantity of water is somewhat less than the desired quantity for grinding and flushing.

Third, operation of the grinder is improved because a more certain supply of water is available. With our former system, should a leaf of lettuce or some other obstruction block passage of water through the separator for any substantial period of time, all the recirculated water would pass through the grinder. Under these circumstances the pump would quickly drain the reservoir, after which there would be no water available for grinding until the reservoir was sufficiently refilled by make-up water to permit the pump to resume operation.

Finally, by introducing cold water directly into

the grinder, the temperature of the water leaving the grinder is reduced and there is less danger of grease being maintained in an uncongealed condition until it gets into the drain, where its congealing in contact with the cold walls of the drain may result in clogging the drain.

A more detailed exposition of the invention is set forth in the following description, which is to be read in conjunction with the accompanying drawings wherein:

Fig. 1 is a side elevation of the apparatus with the front cover plate removed and certain parts broken away;

Fig. 2 is a fragmentary view of one end of the cabinet, looking from the right of Fig. 1 showing the water supply lines;

Fig. 3 is a plan view with the scrapping basin removed and the cover of the separator box hinged back to expose the grinder;

Fig. 4 is a side elevation, similar to Fig. 1, with parts broken away and removed to illustrate the course the table scraps follow in passing through the apparatus;

Fig. 5 is a section taken on the line 5-5 of Fig. 3;

Fig. 6 is a section taken on the line 6-6 of Fig. 5;

Figs. 7 and 8 are modified forms of separators which may be employed;

Fig. 9 is a diagram of the electrical circuit for the motor; and

Fig. 10 is a diagram of an alternative electrical circuit.

Referring to Fig. 1 of the drawings, the cabinet generally designated 11 is mounted on a base 12 having depending adjustable legs 13 by means of which the cabinet may be leveled on the floor. The apparatus is provided with a connection to which the soiled water drain of the restaurant or other establishment in which it is installed may be connected. This consists of a T-shaped fitting 15, best illustrated in Fig. 5, to which is connected a sink 16 disposed above it, and a flexible hose 17, the other end of which is clamped on an elbow member 18 located near the middle of the cabinet.

Normally the sink 16 is closed by the overflow pipe 19 which carries at its base a perforated metal stopper flange 20 arranged to seat in the sink. When the overflow pipe is raised, the tank or reservoir portion 21 may be drained, as at the end of rinsing and grinding operations.

Arranged above the vertical inlet to the elbow member 18 is the grinder, generally designated 22, which consists of the housing 23, rotor 24 and shearing plate 25 arranged on the lower side of the rotor. The rotor is provided with teeth 26 which cooperate with the plate 25 to shred garbage or scraps fed into the machine. The construction of the grinder forms no part of the present invention and need not be described in further detail. Power for operating the grinder is derived from electric motor 27, mounted on the frame 14, which extends across the base 12 and is preferably mounted thereon by means of a cushioned mounting including the rubber washers 28 to absorb vibration.

The grinder is completely separated from the reservoir 21 by means of the vertical partition 29 and the sloping deck 30 which is disposed above the motor and extends the full width of the machine. The plate 31 located at the back of the cabinet and closing the space between the deck 30 and the base 12 (see Fig. 5) is removable to permit access to the end of the grinder, whereby

the wing nuts 32 and the end plate 33 of the grinder may be removed should it be necessary to remove the rotor 24 to regrind teeth or make other necessary repairs.

Also located in the tank 21 is the pump 34, the inlet of which is based a short distance above the bottom of the tank. Water pumped from the tank is forced up the gusher tube 35 which lies adjacent the left side of the cabinet, as seen in Fig. 1, and has a curved portion 36 at its upper extremity directing the stream of water toward the center of the cabinet. The same motor that operates the grinder is also utilized to operate the pump and to effectuate the drive, pulleys 37 are mounted on the ends of the motor shaft and the pump shaft, which extend to the left of Fig. 1 into the space enclosed by the removable cover 38. The belt 39 engaging the pulleys 37 also runs over a pulley 40 secured to a shaft 41 for driving the separator mechanism subsequently to be described. The shaft 41 is enclosed in a tubular housing 42, the inner end of which is coupled to a shaft 41' extending from a gear box 43. Shaft 41 is supported by a bearing box 44 mounted on the upright wall 45 of the cabinet. At the end of the shaft 41', there is a worm 46 which meshes with a worm gear 47 located in the bearing box 43 to drive, at right angles to the shafts 41 and 41', the separator 48, best illustrated in Fig. 6.

As shown in Fig. 6, the separator 48 consists of a plurality of spaced discs 49, spacing being accomplished by the formation of annular ribs 50 which abut each other as illustrated in said figure. The discs here illustrated, which are of plain steel are about one sixteenth of an inch thick and are spaced apart a distance about twice their thickness, each disc having substantially the same diameter to provide in effect a cylindrical surface with openings therein through which water may pass while the table scraps and other particles are supported by the peripheral portions of the discs.

The discs 49 are mounted on a hub 51, having a horizontal axis, and are either locked together or otherwise secured to the hub so as to rotate therewith as a unitary structure. The hub 51 has a bore through which the spindle 52 extends, the inner end of the spindle having a groove 53 permitting its engagement with aligned, transverse pins 54 mounted in a recessed portion of the worm gear shaft 55 and the bore of the hub 51, respectively. The outer end of the spindle 52, shown to the right in Fig. 6, has a notched portion 56, permitting the operator to engage it with his fingers when the machine is not running, whereby it may be removed to the right, disengaging the drive and permitting the hub 51 and the discs to be moved sideways between the plates 57 and 58 which form the sides of the separator box. The spindle 52 also serves as an axle for the separator, the outer end turning in a bearing 59 mounted on the rear of the side plate 58. The spindle 52 is retained in driving position by the yieldable snap ring 60 engaging the left hand shoulder of the notched portion 56.

It will be observed by reference to Fig. 4 of the drawings that the separator 48 is disposed above the deck 30 and to the right of the inlet 61 to the grinder. Mounted above the grinder inlet 61 is a stack 62 which has vertical walls on three sides, but which is opened on the side where the separator is located to provide a lateral inlet. A flexible stripping element 63 (see Fig. 4) lies across the separator and removes particles adher-

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ing thereto, discharging them into the grinder stack. The direction of rotation of the separator is illustrated by the arrow as shown in Fig. 4. Across the top of the stack 62 is a hinged cover 64 which may be opened to the position shown in Fig. 3 to expose the grinder located beneath it. Slots 65 are located on the back side of the stack 62 and since the elevation of these slots is lower than the top of the overflow pipe 19, overflow from the reservoir or tank passes through the slots into the grinder rather than through the overflow pipe 19. The latter, however, serves as a source of emergency overflow should the grinder stop and also vents the underside of the grinder. The latter is important should the grinder create a vacuum on its underside because of abnormal grinding conditions.

At the top of the cabinet is a flanged portion 66 having an inwardly extending rim 67 on which the catch basin 68 is mounted. The basin 68 has a central opening 69 and a depressed silverware trap 70 with a lateral opening 71 through which the table scraps and the water are designed to flow. The design of this basin per se forms no part of the present invention but it should be pointed out that at the side opposite from the opening 71, there is an opening in the basin arranged to register with the end of the pipe 35 so that the rinsing water issuing from the latter may spout over the basin and pass therethrough.

The outlet from the catch basin 68 is almost directly above the separator 48, a baffle plate 72 lying across the top of the separator serving to direct the water and scraps from the catch basin to the top of the separator. Baffle plate 72 is also preferably of flexible material so that should material tend to wedge between it and the separator it may yield. Together with the side plates 57 and 58, the plate 72 and the stripper 63 serve to confine the separator and determine the course of travel of scraps through the separator box.

Referring now to Fig. 2, there is shown mounted on the back side of the cabinet, the water supply piping consisting of the cold water supply line 73 and the hot water supply line 74. These communicate with each other through a blending valve 75 and are of course provided with valves (not shown), the opening of which causes hot and cold water to pass therethrough, respectively. Normally water of from 105° to 110° F. is the desirable temperature for rinsing dishes. The outlet from the blending valve 75 is disposed vertically above a cup 76 mounted on the wall of the cabinet and having an opening 77 in its lower portion permitting water to pass directly into the tank or reservoir 21. The blending valve 75 is arranged sufficiently above the cup 76 to eliminate any possible danger of back-siphonage.

The cold water supply line 73 also communicates through piping 78 with the header pipe 79, the latter having a series of perforations 80 on its lower side. Water falling from the header pipe 79 is caught in a cup 81 which communicates through openings 82 (see Figs. 3 and 4) with the conduits 83 located on each side of the separator box. Thus additional cold water is supplied directly to the separator box and flows down the sides thereof into the grinder stack and hence into the grinder 22.

It is important that certain control elements be provided to insure proper operation of the grinder and also to safeguard the operator. To insure a minimum supply of water, there is provided in the electrical circuit for the grinder motor (diagrammatically illustrated in Fig. 9) a

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flow responsive switch 84 which is closed only when an adequate flow of water is passing through the cold water piping 78. The construction of the flow responsive switch need not be set forth in detail as it is a well known instrument commonly used. Reference may be had to Powers Patent No. 2,244,402 illustrating such a switch in connection with a domestic garbage grinder.

The motor circuit is likewise provided with a safety switch 85 actuated by a plunger 86 located near the top of the cabinet as shown in Fig. 4. The plunger 86 is operated by the reciprocating pin 87 which is spring loaded to maintain it in extended position where it is engaged by the button 88 mounted on the lower side of the catch basin 68 so that when the latter is in position, the beveled portion of the pin 87 depresses the plunger 86 and closes the circuit.

The button 88 extends between the rim 67 and the top of the gusher tube 35 and to remove the basin from the cabinet the right hand side as shown in Fig. 4 must be elevated first to disengage the button from beneath the rim. Thus any silverware which is caught in the salvage basin 70 is retained during removal and is not inadvertently discharged onto the separator and into the grinder. With the basin removed, the switch 85 is open and the grinder will not run. This protects the operator should he then hinge back the cover 64 to inspect the grinder. Both switches 84 and 85 must be closed before the grinder will operate.

An alternate electrical circuit is illustrated in Fig. 10, where instead of a flow responsive switch being employed, a pressure switch 89 is actuated by pressure in the piping 78. By inserting a restricted opening 90 between the pressure diaphragm 91 and the outlets 80, pressure is developed which closes the switch 89, and by relating the size of the opening 90 to the pressure at which the switch is set, a predetermined minimum flow of water to the grinder is obtained as a condition of its operation. Orifice 90 may be of the type shown in Patent No. 2,389,134, issued November 20, 1945, entitled Flow Control Valve, and not only serves to establish the pressure required for operation of the switch 89, but it may also control the maximum quantity of water passing to the grinder; in the latter instance, a rubber annulus forming the opening contracts under additional pressure to restrict the flow. The electrical circuit shown in Fig. 10 is three phase and the switch 85' is similar to the switch 85 except for the fact that it makes two sets of contacts instead of one under influence of the plunger 86, as diagrammatically illustrated in Fig. 10.

The operation of the apparatus may be briefly summarized as follows: The valves that control the hot and cold water are opened to make available an adequate supply of each. The actual quantity of water issuing from the blending valve as well as its temperature is controlled by the setting of the blending valve. The quantity of water may well be in the neighborhood of 2 gals. per minute with apparatus as illustrated herein. About the same time that the water valves are opened, the motor starting switch is closed, and the pump 34, the grinder 22 and the separator 48 are set in operation. Water flows from the gusher tube 35 at a rate of approximately 20 gals. per minute and follows an arching path back to the catch basin 68, thence through the salvage basin 70 and into the separator box which confines the ends of the separator 48. As dishes are

held under or passed through the column of water from the gusher tube, they are rinsed and table scraps are carried with the used rinsing water to the separator.

The speed of rotation of the separator is important so that bones, lettuce leaves and other table scraps will be propelled thereby into the grinder while the bulk of the water passes through the separator back to the reservoir. Thus the warm water is retained for re-use, but since water is constantly being added to the reservoir some of it must go to drain and the slots 65 in the grinder stack accomplish this purpose. This overflow of water prevents the rinsing water from becoming too contaminated.

It has been found that the grinder requires both for grinding and for drain-flushing purposes substantial water in excess of the minimum amount required for rinsing purposes, i. e., the quantity passing through the slots 55. Hence the auxiliary supply of cold water from the pipe 73, the cup 81 and the channels 83 is provided. The amount of water provided in this manner is approximately 3 gals. per minute and the flow responsive switch 84 or the pressure switch 89 (depending on which arrangement is employed) insures that substantially this quantity of water is provided as a condition for the operation of the grinder. If the switch is not closed at the time operations are commenced, because of insufficient flow or pressure, the cold water supply valve is opened further until adequate flow or pressure is created to close this switch.

In Figs. 7 and 8, modified forms of separators are illustrated, the separator shown in Fig. 7 being a cylinder 92 of approximately the same diameter as that of the discs heretofore described and having oblong slots 93 in its surface. These slots 93 provide surface portions between them of a thickness comparable to the thickness of the discs and provide openings between them comparable to the space between the discs. Circumferentially, they are spaced apart as closely as they can be while maintaining the strength to support and propel the table scraps falling on the separator. The cylinder 92 is supported on the hub 51 by means of the spiders 94.

The separator shown in Fig. 8 consists of a helical flight 96 of constant diameter mounted by struts 97 on the hub 51. The helical flight 96 may be formed from a wire having a diameter substantially equal to the thickness of the discs 49. The same ratio of surface portion for supporting the table scraps to the opening for passage of water through the separator is maintained in the three embodiments of the invention illustrated. The separators shown in Figs. 7 and 8 are interchangeable with the separators shown in the other drawings and they will cooperate with the feeding plate 72 and the stripping plate 63 as previously described. Either separator may be slid vertically from between the ends of the separator box 57 and rinsed or cleaned when the drive spindle 52 is removed as heretofore described.

The speed reduction effectuated by the drive of the separator including the worm 46 and worm gear 47 is such that the separator revolves in the range of 200 to 300 R. P. M., a rate which has been found to make the separator substantially self-cleaning in conjunction with the water flushing through it. The table scraps which rest on the surface of the separator are propelled into the grinder while some of the smaller particles which may pass between the surface portions of

the separator and momentarily lodge on the sides of the openings are thrown by centrifugal force outwardly from the separator. Substantially higher rates of speed produce too much centrifugal action and result in excessive water being thrown from the separator.

The slope of the baffle plate 72 and the circumferential portion of the separator which it approaches encourage the downward passage of water through the separator and not over the top of the separator into the grinder as would be the case if the plate were set more nearly tangential to the separator. The pocket formed between the plate and the revolving separator is too small, considering the speed of rotation of the separator, to permit table scraps to become lodged and held therein. Instead they are conveyed upwardly and over the separator, and such water as strikes the plate 72 and is deflected thereby assists their conveyance, the water itself being then directed down through the separator to the reservoir, from which it is eventually wasted.

The invention having been described, what is claimed is:

1. In apparatus for disposing of table scraps rinsed from dishes and other tableware; a cabinet, a grinder having a feed stack provided with a lateral inlet, a separator box communicating with said inlet, a rotary separator mounted on a horizontal axis extending across said box, said separator having surface portions disposed to propel solid particles through the inlet while permitting water to fall through the separator, a tank for collecting the water falling through the separator, means for re-using the water collected in the tank for rinsing purposes, and means for supplying an auxiliary supply of water to the grinder comprising a conduit extending through the cabinet and a water receiving cup communicating with said conduit located outside the cabinet.

2. In apparatus of the class described, the combination of a support, a grinder, a removable catch basin mounted on the support for receiving table scraps and rinsing water, said basin having a depressed portion for trapping silverware and a lateral discharge outlet from which the table scraps may pass to the grinder, instrumentalities operated by the catch basin rendering the grinder operable when the catch basin is mounted on the support and inoperable when removed, and means effecting engagement between the support and the basin requiring initial elevation of the side of the catch basin in which the discharge outlet is located prior to disengagement of the basin from the support, whereby silverware is retained in the basin during removal of the basin from the support.

3. In apparatus of the class described, the combination of a support having a rim, a gusher tube extending upwardly adjacent said rim, a removable catch basin mounted on the support for receiving table scraps and rinsing water and having an aperture registerable with the gusher tube, said basin having a depressed portion for trapping silverware and a lateral outlet from which the table scraps may be discharged, and a protrusion extending from the side of the basin opposite from the outlet and between said aperture and the periphery of the basin, said protrusion extending laterally from the basin beneath said rim in a position to prevent elevation of that side of the basin when the basin is mounted on the support, the arrangement requiring initial elevation of the side of the catch basin in which the discharge

outlet is located prior to disengagement of the basin from the support whereby silverware is retained in the basin during removal of the basin from the support.

4. In apparatus for rinsing tableware and eliminating table scraps, a reservoir, means for supplying to the reservoir a mixture of hot and cold water blended to the desired temperature for rinsing purposes, means for taking water from the reservoir and discharging it so it may be used to rinse table scraps from tableware, means for separating the table scraps from the rinsing water after such use, means for grinding the scraps, means for wasting water from the reservoir, and means for supplying to the grinding means, without passing through the reservoir, a supply of cold water to satisfy the excess requirements of water for grinding over that required for rinsing purposes.

5. Apparatus as set forth in claim 4 including means controlling operation of the grinder rendered operable only when an adequate predetermined supply of cold water is provided directly to the grinder, said means being operable independently of whether or not the reservoir is filled with water.

6. In apparatus for rinsing tableware and disposing of table scraps having a grinder to disintegrate the scraps and a recirculating water system arranged to provide a supply of warm rinsing water and to return the same to a holding reservoir, means for separating the table scraps from the rinsing water and for feeding the scraps to the grinder comprising a self-cleaning, rotary drum-like member having its upper portion ar-

ranged to intercept passage of liquid to the grinder, said member constituting spaced discs arranged to lift and propel scraps thereover while allowing water to pass through its lower portion, means for rotating said member to centrifugally propel scraps lodging on the sides of the openings in the discs into the grinder, such centrifugal action cooperating with the passage of water through the separator to maintain the separator substantially self-cleaning without discharging excessive warm water into the grinder, and means for supplying auxiliary cold water directly to the grinder to aid in grinding the scraps.

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