Jan. 29, 1963 E. MARUE 3,075,215

AUTOMATIC DISHWASHER AND MEAL TABLE

Filed June 8, 1961 3 Sheets-Sheet 1

Fig. 1

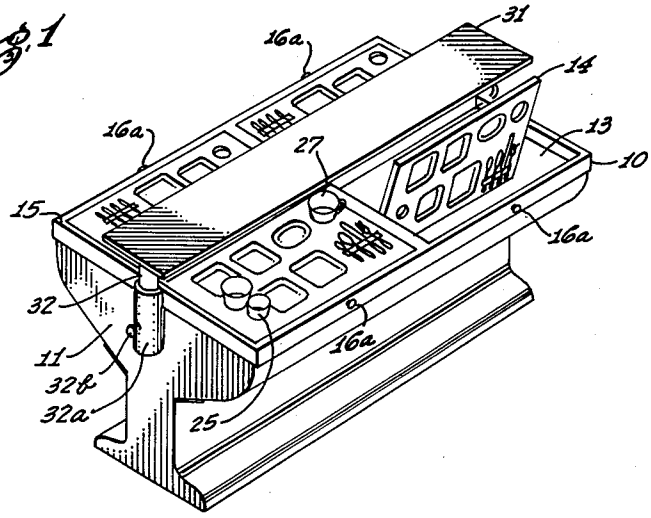
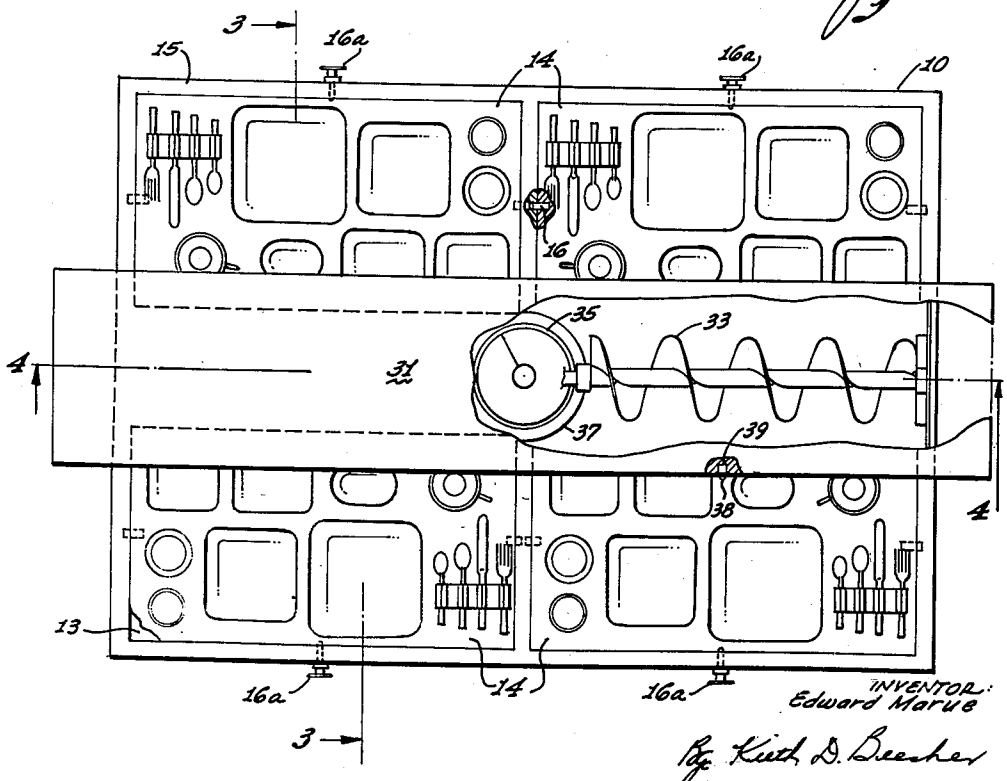


Fig. 2



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AUTOMATIC DISHWASHER AND MEAL TABLE

Filed June 8, 1961 3 Sheets-Sheet 2

Fig. 3

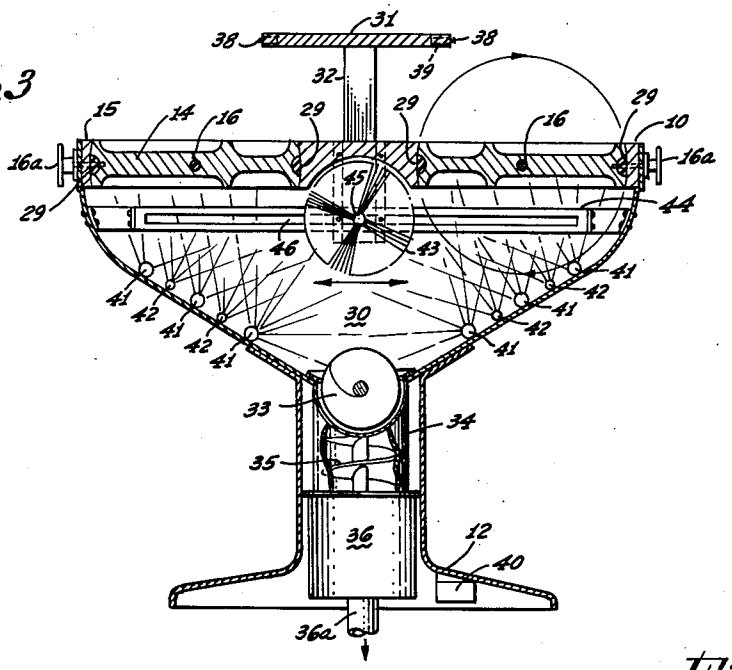
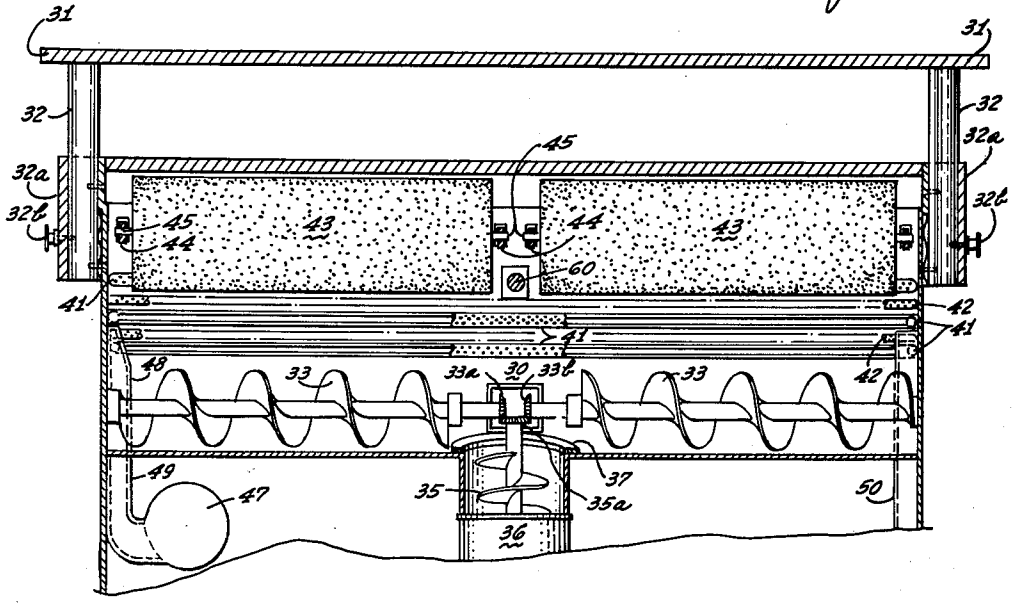


Fig. 4



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AUTOMATIC DISHWASHER AND MEAL TABLE

Filed June 8, 1961 3 Sheets-Sheet 3

Fig. 5

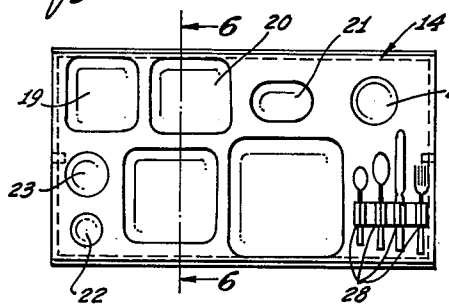


Fig. 6

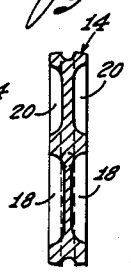


Fig. 9

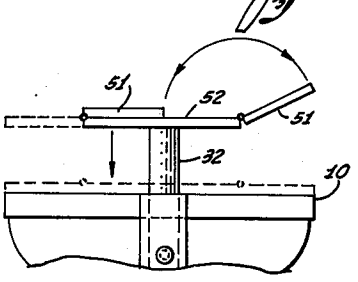


Fig. 7

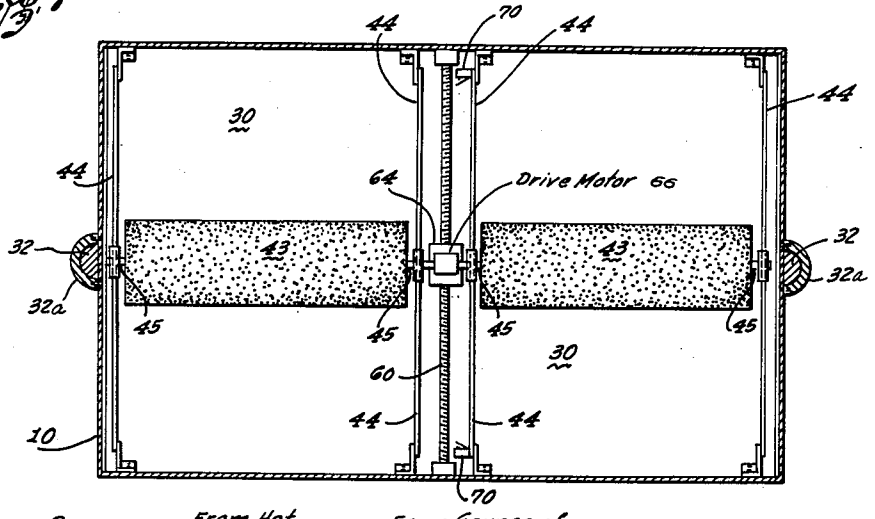
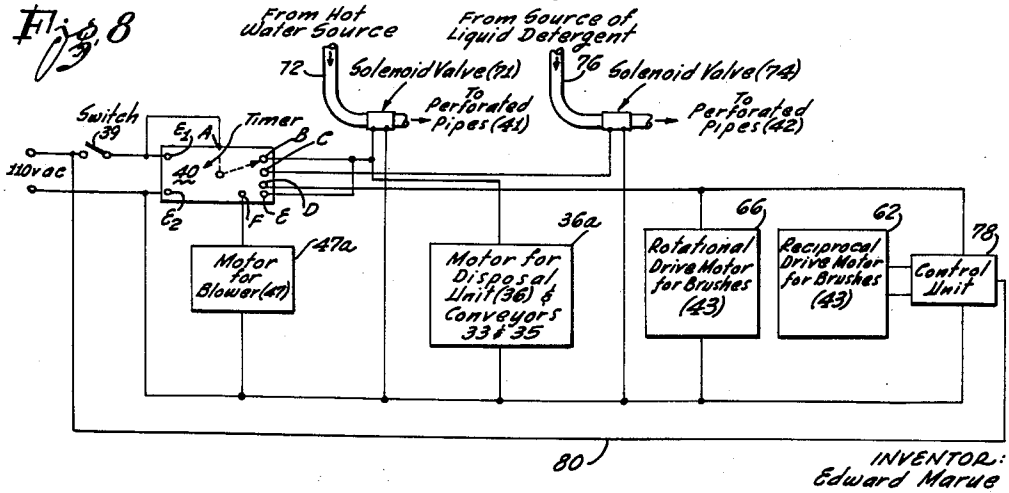


Fig. 8



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United States Patent Office 3,075,215 Patented Jan. 29, 1963

3,075,215

AUTOMATIC DISHWASHER AND MEAL TABLE

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Filed June 8, 1961, Ser. No. 115,693
3 Claims. (Cl. 15—77)

The present invention relates to automatic meal tables, and it relates more particularly to an improved meal serving table for use in a household or in restaurants, by means of which the dispensing of meals and the washing of utensils are facilitated to a large extent.

The present invention is a continuation-in-part of copending application Serial No. 42,248 filed July 12, 1960, in the name of the present inventor, and now abandoned.

The time consuming and repetitious operations normally carried out in the serving of a meal and in later washing the dishes has changed little in the last several hundred years. Indeed, except for the use of dishwashing machines in some instances, the methods have changed little since dishes were first used. Dishwashing machinery, moreover, has not changed the situation materially, since a multitude of handling and rinsing operations are still required.

An important object of the present invention is to provide an improved automatic table by which all the operations, such as clearing the table and washing the dishes, previously considered necessary in serving meals, are eliminated.

A more particular object of the invention is to provide such an improved automtaic table which is constructed so that a new meal may be served after the completion of a previous meal without the necessity of removing the dirty dishes and cutlery, or of otherwise cleaning the table after the previous meal.

Another object of the invention is to provide such an improved automatic table which may be constructed to provide any number of settings as a particular application may require.

Yet another object of the invention is to provide such an improved automatic table which is simple and inexpensive in its construction, and yet which operates with a high degree of efficiency to fulfill its intended purpose.

The improved automatic table of the present invention in the embodiment to be described includes a housing having one or more serving trays pivotally mounted flush with its top surface. In accordance with one feature of the illustrated embodiment of the invention, food serving cavities are formed on both sides of each tray, thus enabling a new setting to be provided and a used setting to be placed in a position facing the interior of the housing so that it may be cleaned in a manner to be described, this being achieved merely by rotating the particular tray through 180 degrees. This means that the serving trays need not be lifted out, or otherwise removed, from the housing for cleaning purposes.

Another feature of the invention in the embodiment to be described is the provision of one or more rotating and reciprocally movable scouring brushes within the housing, these brushes being positioned to move back and forth across the interior-facing surfaces of the trays so as to subject such surfaces to a vigorous and rapid scouring action.

Yet another feature of the invention in the embodiment to be described is the provision of a waste disposal unit and of screw conveyors in the housing, the conveyors serving to move the waste material and scraps from the trays towards and into the waste disposal unit.

A further feature of the invention is the provision of magnetic means within the housing for attracting and retaining cutlery and other tableware which may accidentally drop into the housing, so as to prevent such items from being drawn into the waste disposal unit.

The above and other features of the invention which are believed to be new are set forth in the claims. The invention itself, however, together with other objects and advantages thereof may best be understood by reference to the following description, when taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a perspective view of an automatic meal table constructed in accordance with one embodiment of the invention;

FIGURE 2 is a top plan view of the table of FIGURE 1, on a slightly enlarged scale with respect to FIGURE 1, and broken away to reveal an internal screw conveyor and associated elements within the housing of the automatic table;

FIGURE 3 is a cross-sectional view of the table of FIGURE 1, taken substantially along the line 3—3 of FIGURE 2;

FIGURE 4 is a longitudinal section of the table, taken substantially along the line 4—4 of FIGURE 2;

FIGURE 5 is a top plan view of a preferred serving tray adapted for use in the table of FIGURES 1–4.

FIGURE 6 is a cross-sectional view of the tray of FIGURE 5, taken substantially along the lines 6—6 of FIGURE 5, and revealing the manner in which food receiving cavities may be formed on both sides of the serving tray;

FIGURE 7 is a top plan view of the table of FIGURE 1, similar to the view of FIGURE 2, but on a reduced scale with respect to FIGURE 2 and with the top removed so as to reveal a pair of scouring brushes within the housing, and this view also reveals the manner in which these brushes are mounted for rotary and reciprocal motion;

FIGURE 8 is a schematic diagram illustrating the manner in which appropriate electrical connections may be made to various components within the automatic table of FIGURE 1; and

FIGURE 9 is a fragmentary view showing a modified form of the automatic table of the invention.

Reference will now be made to the drawings for a more detailed explanation of the illustrated embodiment of the invention. The automatic table illustrated in the drawings includes a housing 11 having a hollow bottom support portion 12 and which supports a table top 10 on its upper surface. The table top 10 is rigidly attached to the housing 11 and held thereby at the height of a usual meal table.

The table top 10 has a plurality of rectangular apertures 13 extending through it, four of these apertures being illustrated in the embodiment under consideration. A corresponding plurality of serving trays 14 are pivotally mounted in respective ones of the apertures 13. As shown in FIGURE 2, for example, the serving trays 14 may be pivoted in the table top 11 by appropriate pivot pins 16. The trays 14 are pivotally supported in the rectangular apertures 13 in the table top 10 in a manner to be flush with the upper surface 15 of the table top. Suitable spring loaded pins 16*a* extend into the edges of the respective trays 14 to prevent the pivotal movement of the trays until the pins 16*a* are pulled to an extended position.

The serving trays 14 may have the configuration illustrated in FIGURES 5 and 6. The illustrated trays have identical cavities formed on both sides, so that a new table setting can be provided merely by rotating the corresponding serving tray through 180 degrees.

The serving tray 14 of FIGURES 5 and 6 includes, for example, a food receiving cavity 17 on each face which is intended to hold the main course of the meal. There is also provided a soup cavity 18, which may be somewhat

deeper than the cavity 17. A cavity 19 is also provided for bread, a cavity 20 for salad, and a cavity 21 for dessert. The cavity 22 may receive a juice tumbler 25 (FIGURE 1); the cavity 23 may receive a water glass 26, and the cavity 24 may receive a coffee cup 27. Appropriate means may be provided in the cavities 22, 23 and 24 for frictionally retaining the glass and cups in the cavities so that they will not fall out when the tray is reversed for washing purposes.

A plurality of holding clips 28 are also provided for holding the cutlery. It will be appreciated that when the meal is completed, the glasses, tumblers and cups are inserted in their appropriate cavities and the used cultery is set in the various clips 28. Then, the particular serving tray 14 is reversed so that the used side faces the interior of the housing 11. This reversal of the tray brings a new setting on its reverse side flush with the table top. This new setting will include cleaned glasses, tumblers and cups, as well as cleaned cutlery and cleaned food receiving cavities.

As best shown in FIGURE 3, a resilient gasket 29 is mounted in the rim of each of the serving trays 14, and this gasket engages the inner surface of the corresponding rectangular aperture 13. The gasket 29 serves to form a watertight seal around the edge of the corresponding serving tray, so as to assure that it will be established in watertight relationship with the table top 10. It is evident, of course, that the gasket 29 could be mounted in a groove in the table top 10; rather than in the groove in the serving tray 14, as illustrated.

The serving tray 14 and the table top 10, in cooperation with the housing 11 form a cleaning compartment 30 in which various cleaning operations are carried out, as will be described.

The food itself may be served from platters which may be placed on an upper serving platform 31. As illustrated, this platform extends the length of the serving table. The platform is supported in a plane above the plane of the top surface 15 by suitable vertical columns 32. As best shown in FIGURE 7, these columns may be received in appropriate sockets 32*a* formed at each end of the housing 11.

Positioned within the cleaning compartment 30 and extending lengthwise of the housing 11 is a screw conveyor 33. The screw conveyor 33 is rotatably mounted within the cleaning compartment 30 in any appropriate manner and by any appropriate bearings. As shown in FIGURE 3, for example, the screw conveyor 33 is positioned at the bottom of the cleaning compartment 30, and the compartment and housing 11 has such a configuration, that food scraps and other waste materials cleaned from the under sides of the serving trays 14 are all caused to fall into the path of the screw conveyor 33.

The screw conveyor 33 includes left and right hand portions (FIGURE 2) which are oppositely driven so that the food scraps are all drawn by the portions inwardly towards a vertically positioned disposal duct 34, as best shown in FIGURE 4.

The upper mouth of the disposal duct 34 is surrounded by a permanent magnet 37, and this magnet serves to attract and retain cutlery and other utensils which accidentally fall into the cleaning compartment 30. In this manner, these items are held from entering the disposal duct 34.

A short screw conveyor 35 extends vertically in the disposal duct 34, and the latter conveyor is mechanically coupled to the conveyor 33 through the illustrated arrangement of the gears 35*a* and 33*a*. The screw conveyor 35 extends into a disposal unit 36, and the disposal unit includes a usual electric motor which not only drives the disposal mechanism, but also drives the conveyor 35, and causes it to drive the left hand and right hand portions of the conveyor 33 in opposite directions through the gear system 33*a*, 35*a*.

The left and right hand portions of the conveyor 33 and the conveyor 35 cooperate to force all the scraps of food into the disposal duct 34, and down into the disposal unit 36 to be discharged through a usual waste pipeline 36*a*. The section is such that all scraps of food are driven from the cleaning chamber 30 in the interior of the housing 11 and discharged through the pipeline 36*a*. This action, in cooperation with other cleansing operations to be described, assures that no food remains in the unit itself, so that unsanitary conditions and odors are eliminated.

The components within the cleaning chamber 30 are electrically energized by an electric switch 39, this switch being actuated by appropriate switch buttons 38. The switch 39 and push buttons 38 are illustrated in FIGURE 3 as being conveniently positioned within the upper platform 31. However, the switch and push buttons obviously may have any other convenient position. A timer 40 for sequencing the mechanical operations of the mechanism, is positioned within the base of the unit, as shown in FIGURE 3.

A plurality of hot water pipes 41 are mounted on both sides of the housing 11 within the cleaning compartment 30, as best shown in FIGURES 3 and 4. These water pipes are apertured, and they are so positioned that when pressurized hot water is introduced into them, resulting hot water streams or sprays issue from the apertures and impinge on the under-side of the serving trays 14 to clean and rinse the trays.

Spaced between each of the water pipes 41 are a plurality of liquid detergent pipes 42. The liquid detergent pipes 42 are also apertured, and are so positioned that when pressurized liquid detergent is introduced into these pipes, resulting detergent sprays are directed towards the under-side of the serving trays 14. It is evident, that the liquid detergent pipes 42 and the hot water pipes 41 can be combined into a single set of apertured pipelines, with the hot water and liquid detergent being selectively introduced to the system.

As best shown in FIGURES 3, 4 and 7, a pair of scouring brushes 43 are positioned in the cleaning chamber 30 for rotational and reciprocal motion. For this purpose, the scouring brushes 43 are mounted on shafts 45 which, in turn, are rotatably mounted in guide strips 44. The guide strips 44 are mounted in the cleaning chamber 30 by any appropriate means, and in the illustrated positions. Each of the guide strips 44 has a narrow slot 46 extending along its length, and the shafts 45 are free to move reciprocally in these slots.

A lead screw 60 (FIGURE 7) is rotatably mounted in the housing 11 by any suitable means, and the lead screw extends across the housing between the two central guide strips 44. The lead screw 60 is rotatably driven by a drive motor 62 (FIGURE 8). A threaded bearing member 64 is supported on the lead screw, and rotation of the lead screw causes the member 64 to move back and forth across the cleaning chamber 30 in the housing 11. The shafts 45 of the scouring brushes 43 extend into the bearing member 64, and are rotatably supported therein. A drive motor 66 for the shafts is supported on the member 64. The drive motor 66 is energized in any appropriate manner, and it is appropriately coupled to the shafts 45 to impart rotational motion to the scouring brushes 43.

A pair of limit switches 70 are provided, and these limit switches are engaged by the threaded bearing member 64 at each extremity of its travel. The limit switches 70 are connected to the drive motor 62, and they cause the drive motor to reverse its drive of the lead screw 60 in known manner as the member 64 reaches either extremity. In this way, so long as the drive motor 62 is energized, the scouring brushes 43 are caused to move reciprocally back and forth across the cleaning chamber 30.

As best shown in FIGURE 3, the scouring brushes 43 are positioned so that their bristles will extend into intimate contact with the under surface of the trays 14 as the brushes move back and forth under the control of the drive motor 62, and these scouring brushes serve to

remove all scraps and particles from the underside of the trays, as they are rotated by the drive motor **66**.

A blower **47** is mounted within the housing **11**, and this blower serves to introduce a blast of pressurized hot air through a duct **49**. The hot air emerges from an aperture **48** at the upper end of the duct, and is directed across the under-sides of the serving trays in the cleaning chamber **30**, and out through a return duct **50**.

In the modification of the invention shown in FIGURE 9, the platform **31** is represented as **52**, and is equipped with leaves **51**. When these leaves are opened out, they cooperate with the platform **52** to provide a flat uninterrupted top over the unit. For this purpose, the supports 32 are telescopically received by the sockets **32***a* in a frictional engagement to permit the top surface to be moved up and down at will. Set screws **32***b* may be provided to hold the supports in any desired axial position in the sockets **32***a*. It is evident, that when the leaves **51** are turned out flush with the platform **52**, and when the supports **32** are telescoped down into the sockets **32***a*, the resulting assembly may be used for any usual table purposes. On the other hand, when the leaves **51** are turned in on the platform **52**, and the assembly raised to a position, such as the position of the platform **31** in FIGURE 3, the assembly may serve the above-mentioned function of supporting platters of food.

FIGURE 8 is useful in explaining the sequence in which the various mechanical operations of the automatic table of the invention may be carried out.

As illustrated in the electrical diagram of FIGURE 8, the timer **40** has a common terminal A which is connected through the switch **39** to one terminal of a typical 110 volt alternating current source. This source is also connected through the switch **39** to a pair of input terminals E1 and E2 which serve to energize the timer. The timer **40** operates in known manner to establish a timed sequence, a connection between the common terminal A and a plurality of output terminals B, C, D, E and F.

When the switch **39** is first closed, the timer is energized, and serves to establish a connection between the terminals A and B. After a particular time interval, the connection between the terminals A and B is broken, and a connection is established between the terminals A and C; this making and breaking switching action continues in a timed manner between the common terminal A, and the output terminals D, E and F; and it then repeats in a cyclic manner. Conversely, the timer **40** may be designed in known manner to become de-energized after a first cycle of operations, and to repeat its cycle, only after the switch **39** has been opened and closed once again.

The output terminal E of the timer **40** is connected to a solenoid valve **71** which is positioned in a pipeline **72** extending from an appropriate hot water source to the perforated pipes **41**. The other terminal of the solenoid valve **71** is returned to the other side of the 110 volt alternating current source. Whenever the solenoid valve **71** is energized, it opens to permit pressurized hot water to be introduced to the perforated pipes **41**.

The output terminal B of the timer **40** is also connected to a motor **36***a*. This motor is positioned in the waste disposal unit **36** of FIGURE 3, and it serves to drive the waste disposal unit, and also to drive the conveyors **33** and **35**.

The output terminal C of the timer **40** is connected to one terminal of a solenoid valve **74**. This latter solenoid valve **74** is positioned in a pipeline **76**. The latter pipeline serves to couple the perforated pipes **42** to an appropriate source of liquid detergent. The other terminal of the solenoid valve **74** is returned to the other side of the 110 volt alternating current source. When the solenoid valve **74** is energized, the valve opens so that pressurized liquid detergent may be passed to the perforated pipes **42**.

The output terminal D of the timer **40** is connected to one terminal of the motor **66**. This motor, as described in conjunction with FIGURE 7, imparts rotational motion to the brushes **43**. The other terminal of the motor **66** is returned to the other side of the 110 volt alternating current source.

The terminal D of the timer **40** is also connected to a control unit **78**. This control unit is connected to the limit switches **70** and also to the motor **62**. The motor **62** shown in block form in FIGURE 8, as described above, serves to impart reciprocating linear motion to the brushes **43**.

The internal circuitry of the control unit **78** may take any known form, and need not be described in detail herein. This unit serves to reverse the connections to the drive motor **62** under the control of the limit switches **70**, so that the desired reciprocating motion of the brushes **43** may be realized. The control unit also responds to energization over a lead **80** from the 110 volt alternating current source to return the brushes to a desired central position, as shown in FIGURE 3, after the action of the timer **40** has broken the connection between the common terminal A and the terminal D.

When the switch **39** is closed, the timer **40** is energized, and a connection is established first between the terminals A and B. This causes a spray of hot water to emerge from the perforated pipes **41** and to be directed against the under-sides of the trays **14**. This hot water spray serves as a pre-rinse for the trays, and loosens the food particles. At the same time, the motor **36***a* is energized, so that the conveyors rotate and carry the food particles to the waste disposal unit **36**.

After a pre-selected time interval, as established by the timer **40**, the connection between the terminals A and B is broken to turn off the pre-rinse sprays and a connection is established between the terminals A and C, so that the liquid detergent may be sprayed on the underside of the trays **14** through the perforations in the pipes **42**. After a further predetermined interval, the connection between the terminals A and C is broken to turn off the detergent spray, and a connection is established between the terminals A and D. This latter connection energizes the motors **62** and **66** so that the brushes **43** are activated to scour the interior surfaces of the trays in the described manner.

At the completion of the scouring operation, the timer **40** breaks the connection between the terminals A and D and establishes a connection between the terminals A and E. This latter connection reactivates the hot water sprays from the perforated pipes **41** and reactivates the conveyors **33** and **35** and the waste disposal **36**. At the completion of the second rinse, the connection between the terminals A and E is broken, and a connection is established between the terminals A and F. This latter connection energizes the motor **47***a* for the blower **47** and causes a hot blast of air to be blown into the cleaning chamber **30**. The air blast is heated by any known means, and it serves to thoroughly dry the interior surfaces of the trays **14**, so as to render the trays suitable for the next setting.

The invention provides, therefore, an improved automatic table which greatly facilitates the dispensing of meals, both at home and in restaurants. In accordance with the concepts of the invention, all the materials necessary for serving a meal are supported or formed in pivoted trays. At the completion of any meal, the corresponding tray is pivotally rotated through 180 degrees. This exposes the used utensils to the cleaning chamber, and also immediately brings a new setting to the table top.

The described embodiment of the invention is advantageous in that a thorough cleaning action is obtained through the joint action of scouring brushes, detergent sprays and hot water rinses. Also, all food particles are removed from the unit itself by the described conveyors, and brought into a waste disposal unit. This prevents

the formation of unsanitary conditions and bad odors from the equipment.

While a particular embodiment of the invention has been shown and described, modifications may be made and it is intended in the appended claims to cover all such modifications that fall within the true spirit and scope of the invention.

I claim:

1. An automatic meal table including: a housing, a table top mounted on said housing and having at least one aperture therein, support means mounted on said housing and extending upwardly from said table top, a serving platform mounted on said support means and extending parallel to said table top in spaced relationship with said table top, at least one serving tray pivotally mounted in said aperture and including a plurality of food receiving cavities formed on at least one side thereof, at least one scouring brush mounted in said housing for rotatable and reciprocal movement, said brush being positioned to engage the under side of said serving tray and the food receiving cavities therein upon such reciprocal movement, means for rotatably driving said brush and for reciprocally driving said brush across the under side of said serving tray, spray means positioned in said housing for spraying hot water and liquid detergent upon the under side of said serving tray, blower means positioned in said housing for introducing pressurized hot air to the under side of said tray, a disposal duct coupled to said housing, electrically activated waste disposal means positioned in said disposal duct, and electrically activated screw conveyor means positioned in said housing for directing waste particles from the serving tray to the entrance of said disposal duct.

2. The automatic meal table defined in claim 1 and which includes magnetic means mounted in said housing and surrounding the entrance to said disposal duct for attracting and retaining metallic articles dropped from said serving tray into said housing so as to prevent such articles from being drawn into said waste disposal means.

3. The meal table defined in claim 1 and in which said support means are movable with respect to said housing to permit said serving platform to be lowered down over said table top, and in which said support platform includes leaves to permit it to cover the area of said table top with a flat surface.

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