

VERSATILE DISHWASHER

[0001] The present application relates to a versatile dishwasher for cleaning eating utensils of food centres or restaurants. The eating utensils may simply be known as
5 utensils, which include bowls, plates, cups, saucers and cutleries. In addition, the present application also relates to methods of making and using a versatile dishwasher.

[0002] Most food centres (e.g. coffee shops or hawker centres), hotels, restaurants and other eateries serve food and drinks without using disposable utensils. Instead, porcelain,
10 metal and glass utensils are commonly deployed, which are repeatedly washed and used. Often, the food centres hotels and restaurants employ dedicated groups of workers to gather and wash soiled utensils. After being cleansed, these utensils are sorted and distributed back to respective stalls in the food centres, hotels and restaurants. The process from collecting dirty utensils to redistributing clean utensils is
15 usually continuously repeated throughout operation hours of the food centres, hotels and restaurants. To clean the soiled utensils, industrial dishwashers are often deployed due to their high washing capacity and efficiency. However, loading and unloading utensils with the industrial dishwashers remain laborious, tedious and time-consuming, which inevitably escalates operation cost of the food centres, hotels and restaurants.

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[0003] As a first aspect of the present invention, the present application aims to provide a new and useful versatile dishwasher. The versatile dishwasher is flexible to meet various usage conditions and user's special preferences. The versatile dishwasher also saves much space for users of the versatile dishwasher because the versatile
25 dishwasher requires little room to manoeuvre or operate. Essential features of the

invention are provided by one or more independent claims, whilst advantageous features are presented by their dependent claims respectively.

[0004] The versatile dishwasher comprises a washer for cleaning soiled eating utensils,
5 an eating utensil carrier (i.e. carrier) for detachably coupling with the washer and one or more doors (e.g. gates) for detachably sealing the washer during a cleaning process inside the washer. The washer further has one or more openings for receiving and/or releasing the eating utensil carrier. In use, soiled utensils are collected and put into the eating utensil carrier. The eating utensil carrier is subsequently coupled to the washer
10 for cleaning soiled eating utensils inside the versatile dishwasher. The doors may be also detachably mounted onto a transporter that is used for moving the soiled eating utensils on a ground.

[0005] Optionally, the versatile dishwasher may have auxiliary devices in addition to the
15 washer. For example, multiple cleaning devices can be integrated to the versatile dishwasher for better cleaning effect, such as a pre-washing module for purging food residue, a rinsing module (e.g. sanitizer), and a drying module (e.g. dryer). To be more convenient and efficient, other auxiliary devices can be also installed to the versatile dishwasher, including a table for supporting the eating utensil carrier, an automatic
20 transfer mechanism for bring into and/or receiving out of soiled eating utensils, a locking mechanism for securing the eating utensil carrier to the washer, a control unit for checking status of the dishwasher in various processes, and an automatic transfer mechanism for moving the carrier into and/or out of the washer. Although multiple auxiliary devices are available, the versatile dishwasher as a whole is compact such that

the versatile dishwasher can be conveniently installed in a food centre, hotels or restaurant without occupying much space.

[0006] With the new and unique structures of the present application, the versatile dishwasher combines the advantages of industrial dishwashers and domestic dishdrawers (i.e. dish drawer or dish-drawer). On one hand, the versatile dishwasher has comparable washing capacity with industrial dishwashers; on the other hand, the versatile dishwasher also enjoys the benefits of improved design flexibility to meet various usage conditions and user's special preferences. when it is compared with domestic dishdrawers. The versatile dishwasher may use water, detergent (e.g. electrolysis of water for providing acid & alkaline), steam or other cleaning agents for removing stubborn stains, depending on nature the soiled utensils, such as by oil/butter or sauces. The versatile dishwasher may also adopt different washing conditions (e.g. detergent usage or steam temperature) for cleaning diverse types of soiled utensils.

[0007] In particular, the door of the versatile dishwasher is specially configured or adapted to be detachably coupled with the washer for providing an enclosure with the washer during the cleaning process. The door may be a single whole piece or comprise multiple smaller pieces. The door is either permanently or temporarily connected to the washer or detachably coupled to the eating utensil carrier. For example, the door can be permanently connected to the washer that the door is turned open for receiving or releasing eating utensils and turned closed during the cleaning process. Alternatively, the door can be detached from the washer for receiving or releasing eating utensils and coupled with the washer during the cleaning process. Or the door can be coupled to the eating utensil carrier instead of the washer when eating utensils are transferred into and

retrieved from the washer. The door also has a sealing structure for closing tightly the eating utensil carrier with the washer during the cleaning process.

[0008] In accordance with the eating utensil carrier, the versatile dishwasher has two optional working modes in the present application: a static working mode and a dynamic working mode. In the static working mode, the eating utensil carrier is non-mobile and thus suitable for such working environment with no path or limited space to move around. In the dynamic working mode, the eating utensil carrier further comprises a transporter for moving soiled eating utensils on a ground. The transporter can be four-wheelers such as a mobile cart, a mobile dolly and a handcart; three-wheelers; two-wheelers or other suitable mobile vehicles. In the case of two wheelers, a support stand similar to a bike stand might be needed for supporting the transporter when the transporter is not moving. The carrier may comprise one or more baskets for holding eating utensils in position before, during and after washing. In other words, the basket is transferred into and retrieved out of the washer together with eating utensils. The basket is preferably vertically movable to reach a height substantially the same as the opening.

[0009] the washer of the versatile dishwasher has at least one opening for receiving the eating utensil carrier and/or releasing the eating utensil carrier. Each of the at least one opening is configured to be detachably sealed by the sealing structure of the door for preventing water leakage and other relevant hazards. The one or more openings can be provided on one side of the washer, such as the front side, the back side, the left side or the right side. For example, a first opening and second opening are provided on the front side of the washer. The first opening is positioned at a bottom of the second opening. Alternatively, the openings can also be provided on two or more sides of the washer for

different loading and unloading programs. For example, an opening is provided on the front side and another opening is provided on the back side (opposite sides design for a through-passing loading and unloading program). For another example, an opening is provided on the front side and another opening is provided on the left side (neighbouring
5 sides design for a L-loading and unloading program).

[0010] In details, the opening may comprise a window both as an inlet for receiving soiled eating utensils and as an outlet for releasing washed eating utensils. Alternatively, the opening may comprise one window as an inlet for receiving soiled eating utensils and
10 another window as an outlet for releasing washed eating utensils. In this case, two different types of windows are needed for the washer to fulfil the functions of receiving soiled eating utensils before the cleaning process and releasing washed eating utensils after the cleaning process. Or the washer may have a mixture of the three types of windows for higher productivity and users' preference.

[0011] The opening further comprises one or more slits for receiving a tray. According to a specific usage condition and user's special preferences, the slits can be either vertically or horizontally aligned for easier operation. Each of the slits can also be different in shape, size or position for receiving various types of trays. After being
20 transferred into the washer, the trays may be cleaned together with or separately from soiled eating utensils. When the trays and eating utensils are made of different materials, suitable detergent or solvent can be chosen for better cleaning effect if the trays are cleaned separately from the eating utensils.

[0012] As discussed above, the versatile dishwasher has one or more doors that can be detachable from, connected to and sealable with the washer. After soiled utensils are loaded into the washer, the door is connected to the washer at the side with the openings. The sealing structure of the door, such as a mechanical seal, a labyrinth seal for sealing the eating utensil carrier during the cleaning process. The sealing structure is designed to withstand heat, acid, alkali, pressure or a combination of any of these for hermetically sealing the versatile dishwasher during the cleaning process. The sealing structure helps join parts or mechanisms together by preventing leakage (e.g. in a plumbing system), containing pressure, or excluding contamination. The effectiveness of the sealing structure is dependent on adhesion in the case of sealants and compression in the case of gaskets. Meanwhile, the openings are also configured to be detachably sealed by the door to prevent water leakage or other potential hazards. After the cleaning process, the door can be detached from the openings. Alternatively, the door may comprise multiple smaller pieces and each of the pieces is designed to seal one opening during the cleaning process. In another optional design, each of the multiple pieces of the door may be designed to individually seal one window either as an inlet or as an outlet.

[0013] The washer has a unique fluid circulation mechanism that saves enough internal space of the washer for avoiding collision with the carrier when the carrier is coupled with the washer. The fluid circulation mechanism has one or more spray arms for discharging a cleaning fluid (e.g. clean water, recycled water and detergent) onto soiled eating utensils in the dishwasher. The fluid circulation mechanism also has a tube connected to the spray arms. The tube is used for transporting a cleaning liquid from an external source such as a tank to the tube of the fluid circulation mechanism of the washer. The spray arm is configured to move (e.g. rotate, swing, shift, hake, vibrate, or

rock) within a predetermined range (e.g. angle, distance) in order to cover a wide area of soiled eating utensils. For example, the spray arm further comprises a rocking mechanism that enables the spray arm to rock for as large as 180-degree. When the operation of the spray mechanism of the tube and the operation of the rocking mechanism of the spray arm are combined during the cleaning process, multiple pieces of the soiled eating utensils inside the internal space of the washer are fully covered and completely washed by the cleaning liquid.

[0014] The washer further comprises a strainer for preventing solid particles or slurry from blocking an internal or external drainage system connected to the versatile dishwasher. The strainer allows rinsed or used water to pass through so that the rinsed or used water can be recycled for flushing soiled eating utensils again. Clean water consumption by the versatile dishwasher is drastically reduced. In details, the strainer can comprise a cyclone filter that is adapted to automatically purge out the solid particles, slurry or food debris from recycled water. The cyclone reduces or avoid usage of filtering screen or net so that the versatile dishwasher is less dependent on the supply of consumables, such as filtering screens.

[0015] The strainer further may comprise a waste collector for storing the solid particles or the slurry. The waste collector may be periodically cleaned so that food waste may be collected for recycling. Additionally, the solid particles or the slurry may be removed from waste water discharge from the versatile dishwasher so that a sewage system or drainage system of a food court or restaurant will be blocked. The strainer may comprise a fluid trap for draining sewage water from the versatile dishwasher to the drainage system without spillage (e.g. dirtying floor of the food court).

[0016] The versatile dishwasher may further comprise a table that is either permanently or detachably connected to the washer for supporting the eating utensil carrier. Optionally, the height of the table is adjustable to reach the position of the openings so that soiled eating utensils are easily loaded into the washer before the cleaning process and the washed eating utensils are also easily unloaded out of the washer after the cleaning process. In this way, the arduous labour work is saved of elevating the soiled eating utensils up from the ground to the openings and dropping the washed eating utensils down from the openings to the ground.

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[0017] The table may comprise a rubbish bin. The rubbish bin can remove large food particles from soiled eating utensils before loaded into the washer. The rubbish bin can be rotatable, detachable or both rotatable and detachable for emptying rubbish. An operator can easily flip the rotatable rubbish bin for emptying. If a full rubbish bin is removed, an empty rubbish bin is conveniently attached to the table for resuming collection of food particles from soiled eating utensils. The rubbish bin can comprise two containers, which enclose each other. An inner container has perforations for draining sewage water and collecting solid food debris, whilst an outer container has an enclosed bottom for keeping the sewage water dripped from the solid food debris or slurry. The rubbish bin can additionally comprise a side rubbish bin for collecting sewage water from rubbish in the rubbish bin. The side rubbish bin can be attached to a perforated bottom of the rubbish bin so that sewage water can be dripped and collected at the side rubbish bin.

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[0018] The versatile dishwasher further comprises an automatic transfer mechanism for moving soiled eating utensils into and/or washed eating utensils out of the washer. Similar to the table described above, the height of the automatic transfer mechanism is adjustable to reach the position of the openings for easy operation. In this way, the arduous labour work is also saved of transferring and transferring the soiled eating utensils into the washer and retrieving the washed eating utensils out of washer. The soiled eating utensils may be held in a basket before, during and after the cleaning process. In other words, the basket is cleaned together with the soiled eating utensils inside the washer.

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[0019] The eating utensil carrier may comprise one or more racks for holding one or more baskets on each of the racks. The racks are fixtures of the eating utensil carrier for receiving baskets. The one or more racks may be resistive to corrosion and/or mechanical shocks so that the eating utensil carrier becomes durable for long-term operation. The one or more racks may comprise a first rack and a second rack for holding the utensils of different heights. The utensils may have diverse shapes, sizes and/or heights. Two or more racks of the eating utensil carrier with different heights provides suitable space for receiving the utensils into the baskets without wasting space/height between loaded utensils and their upper rack. More utensils may be packed into the eating utensil carrier such that an interior space or room in the eating utensil carrier may be effectively utilised. Instead of having racks with same sizes, a rack or basket with a short distance from a base of the rack to a bottom of its upper rack (known as the height of the rack or basket) accepts utensils with suitable sizes, wasting less loading capacity of the eating utensil carrier.

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[0020] The one or more racks can be configured to detachably hold the one or more baskets. Baskets of diverse sizes are suitable for holding a variety of eating utensils so that the same versatile dishwasher is suitable for food catering of different preferences, culture or duty of usage. The one or more racks may also comprise a height adjustment mechanism for holding the baskets of different heights. The height adjustment may be discrete or continuous so that the baskets or utensil of diverse sizes may be contained by the eating utensil carrier for washing. The height adjustment mechanism may be electrically or mechanically regulated so that the height adjustment may be achieved with simplify, accuracy or reliability.

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[0021] In addition to the sealing structure of the door, the versatile dishwasher further comprises a locking mechanism for securing the door or the multiple pieces of the door to the washer during the cleaning, such as a shut-tight door, a latch or both. The locking mechanism can either be manually or automatically (e.g. connected to a computer) operated so that the doors or the multiple pieces of the door are prevented from being decoupled when the washer is in washing operation.

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[0022] The versatile dishwasher further comprises a control unit that regulates operation of the versatile dishwasher and communicates with external electronic devices. The control unit can transmit operation data to a remote computer sever for data analysis and operation monitoring. According to users' preference, the control unit may have different types of control units, including a temperature control unit for controlling the temperature of the cleaning fluid during the cleaning process; a water control unit for controlling the volume and speed of the cleaning fluid sprinkled out of the spray arms;

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and a detergent control unit for controlling composition of the cleaning fluid by adjusting the ratio of the detergent to water.

[0023] In particular, the control unit includes a warning device for checking status of the door, the locking mechanism or both enclosing the openings during the cleaning process. The warning device includes a warning light, an audio alarm or the alike. When the door is not coupled with the washer tightly or the locking mechanism does not secure the door to the washer, the warning mechanism sends out a warning signal to the control unit and an alarm to operators. After receiving the warning signal from the warning mechanism, the control unit suspends or stops the cleaning process in the washer until the warning signal is cleared for the system fault.

[0024] The versatile dishwasher may further comprise a safety mechanism that can detect gas leakage, water spillage, hazardous electric current discharge or any other safety issues. The versatile dishwasher cannot start washing process without resolving these safety issues. The safety mechanism often works together with the warning device. For example, when the eating utensil carrier and the washer are not coupled or locked to each other securely, the safety mechanism cuts off electricity supply to the versatile dishwasher and meanwhile the warning mechanism notifies the control unit to suspend or stop the cleaning process and the operators to resolve the safety issue.

[0025] The versatile dishwasher may further comprise a monitoring system that is configured to observe operation of the versatile dishwasher. The monitoring system may include cameras, computers, sensors and glass windows for observing operation status

of the versatile dishwasher. The cameras may include a thermographic camera (infrared camera or thermal imaging camera), a camcorder, a digital camera and X-ray camera.

[0026] The monitoring system may further comprise one or more indicators for showing
5 operation status of the versatile dishwasher. The indicators may give audio or visual signals to operators so that the operators may observe status of the versatile dishwasher. The one or more indicators can comprise a display screen, a warning light, an audio alarm, a loud speaker, a touchscreen, a transparent window on the versatile dishwasher or a combination of any of these. These indicators can give access or interfaces for
10 regulating or observing the versatile dishwasher.

[0027] As the second aspect of the present application, it discloses the method of making the versatile dishwasher. Firstly, the washer is provided with the unique structures as described above. Secondly, the unique structures are installed to the washer and
15 adjusted according to specific working environment. Thirdly, the eating utensil carrier is also provided with multiple baskets. Fourthly, the door (or multiple door pieces) with the seal structure is provided. Fifthly, various auxiliary devices are provided and installed to the versatile dishwasher according to users' preference. And sixth, the cleaning fluid is made up of detergent and water and supplied to the fluid circulation mechanism.

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[0028] As the third aspect of the present application, it also discloses the method of using the versatile dishwasher. Firstly, loading soiled eating utensils into multiple baskets that are further coupled to the eating utensil carrier. Secondly, moving the eating utensil carrier towards the washer manually or via a transporter. Thirdly, coupling the eating
25 utensil carrier to the openings of the washer by choosing a static working mode or a

dynamic working mode. Fourthly, selecting a specific loading and unloading working program suitable for a specific usage condition and user's special preferences. Fifthly, closing the openings with a door or multiple door pieces; and sealing the openings with a sealing structure. Sixthly, performing the cleaning process with or without a pre-
5 washing process and a rinsing process. Seventhly, disconnecting the sealing structure from the openings and opening the door from the openings. Eighthly, detaching the eating utensil carrier from the washer after the cleaning process according to the working mode and the working program previously selected. And ninthly, maintaining the versatile dishwasher periodically.

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[0029] According to a third aspect, the present application provides a versatile dishwasher that comprise a washing station for cleaning soiled eating utensils. The washing station has one or more inlets for receiving the soiled eating utensils and/or one or more outlets for discharging cleaned eating utensils. The versatile dishwasher also
15 has a carrier for fetching eating utensils with the washing station. The carrier is configured to couple with the washing station for fetching eating utensils at the one or more inlets or the one or more outlets, or detached from the washing station during washing process of the washing station. The one or more inlets or outlets are also known as windows, which can be located at opposite or neighbouring sides of the washing station. For
20 example, the inlet and outlet are parallel or perpendicular to each other.

[0030] The versatile dishwasher can comprise one or more doors or gates for closing an opening (e.g. an inlet, an outlet) of the washing station during the cleaning process so that washing fluids are kept inside the washing station, without being splashed out of the
25 washing station.

[0031] The one or more doors are detachable from or connectable with the washing station, the carrier, or both the washing station and the carrier. For example, a door is mounted onto the carrier initially, but is attached to the washing station for concealing an inlet after loading eating utensils into the washing station at the inlet.

[0032] The carrier may comprise one or more racks for carrying one or more baskets in order to hold the eating utensils at the baskets. The one or more baskets are moved around by the carrier for collecting soiled eating utensils, but enclosed by the washing station during cleaning process. The carrier, however, is not coupled to the washing station during the cleaning process. In contrast, the carrier may be pushed around a hawker centre or restaurant for collecting soiled eating utensils continuously, whilst the baskets of eating utensils are being washed inside the washing station.

[0033] The one or more racks can be adjustable in size, vertical position, lateral position or a combination of these for fetching the eating utensils from the washing station. For example, the carrier has a rack that can be affixed to a first height position, a second height position or a third height position so that the same carrier can feed a basket to any of three inlets of the washing station at various heights.

[0034] Correspondingly, the one or more inlets may comprise a first inlet, a second inlet, a third inlet or more inlets for receiving soiled eating utensils independently. Similarly, the one or more outlets may comprise a first outlet, a second outlet, a third outlet or more outlets for discharging cleaned eating utensils. Any of the inlets may be connected by a

track or rail to any of the outlets respectively. When necessary, multiple inlets or outlets are mutually connected to each other (e.g. first outlet connected to the third inlet).

[0035] The versatile dishwasher can further comprise a locking mechanism for fastening
5 a part (e.g. door) of the washing station. The locking mechanism prevents accidental operation of the versatile dishwasher, which violates predetermined washing protocols of the versatile dishwasher. For example, the locking mechanism comprises a shut-tight door, a latch or both.

10 [0036] The versatile dishwasher may further comprise a warning device for alerting operating status (e.g. on whether the door tightly shut). The warning device includes warning light signals, sirens, vibrations or electronic signals communicated to personal electronic devices of a user (e.g. smartphone).

15 [0037] The versatile dishwasher can comprise a first module for pre-washing operation before the versatile dishwasher for static operation; and a second module for rinsing operation following the versatile dishwasher. The versatile dishwasher is alternatively known as double module conveying system.

20 [0038] The versatile dishwasher may comprise the double module conveying system, and a third module for drying operation following the second module of the double module conveying system. The versatile dishwasher is also known as a triple module conveying system.

[0039] According to a fourth aspect, the present application provides an adaptable dishwasher, which is also known as the versatile dishwasher. The versatile dishwasher comprises a washer (also known washing station) for cleaning eating utensils. The washer comprises a first inlet, a second inlet, a first out outlet and a second outlet. The washer is configured to transfer the eating utensils from one of the inlets to one of the outlets for cleaning.

[0040] Following figures facilitate detailed description of relevant embodiments.

Fig. 1 illustrates a first versatile dishwasher of a static working mode when a first door is connected to a first eating utensil carrier in accordance with a first embodiment of the present application;

Fig. 2 illustrates a first versatile dishwasher of a static working mode when a first door is connected to a first eating utensil carrier in accordance with a first embodiment of the present application;

Fig. 3 illustrates a second versatile dishwasher of a dynamic working mode when a second door is connected to a second eating utensil carrier in accordance with a second embodiment of the present application;

Fig. 4 illustrates internal structures of a second versatile dishwasher when a loaded second eating utensil carrier is coupled with a second washer in accordance with a second embodiment of the present application;

Fig. 5 illustrates a fluid circulation mechanism of a second washer when a loaded second eating utensil carrier is coupled with the second washer in accordance with a second embodiment of the present application.

Fig. 6 illustrates a front loading and unloading program according to a third embodiment of the present application;

Fig. 7 illustrates a side loading and unloading program according to a fourth embodiment of the present application;

Figs.8 illustrates a L-loading and unloading program according to a fifth embodiment of the present application;

5 Fig. 9 illustrates a through-passing program according to a sixth embodiment of the present application;

Fig. 10 illustrates a through-passing program with a pre-washing module and a rinsing module according to a seventh embodiment of the present application;

10 Fig. 11 illustrates a combination of a through-passing program and a side load and unloading program according to an eighth embodiment of the present application;

Fig. 12 illustrates a combination of a through-passing program, a L-loading and unloading program and a side load and unloading program according to a
15 ninth embodiment of the present application.

Fig. 13 illustrates a method of making a versatile dishwasher of the present application;

Fig. 14 illustrates a method of using a versatile dishwasher of the present application.

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[0041] Exemplary, non-limiting embodiments of the present application will now be described with references to the above-mentioned figures. Embodiments of the application comprise parts or method steps that are similar or identical to each other. These parts or method steps are thus denoted with similar or identical names or

reference numerals. Description of these relevant parts of method steps is hereby incorporated by reference, wherever relevant or appropriate.

[0042] According to types of the eating utensil carrier, the versatile dishwasher has two optional working modes: a static working mode and a dynamic working mode. In the static working mode, the eating utensil carrier is non-mobile and thus suitable for such working environment with no path or limited space for moving around. In the dynamic working mode, the eating utensil carrier further comprises a transporter for moving soiled eating utensils around on a ground.

[0043] Figs. 1 and 2 illustrate a first versatile dishwasher of a static working mode in accordance with a first embodiment 100 of the present application. Particularly, Fig. 1 shows the first embodiment of the static working mode 100. The first versatile dishwasher 102 comprises a first washer 104, a first eating utensil carrier 106, a first door 108, a control unit 110 and a locking mechanism 130.

[0044] The first washer 104 may have a front side opening 114, a back opening 115 (not shown), a left side opening 117 or a right side opening 118 (not shown). All of the four openings may further have multiple windows. For example, the front side opening 114 in Fig. 1 has a front top window 120, a front middle window 122 and a front bottom window 124. The front top window 120, the front middle window 122 and the front bottom window 124 are vertically aligned from the top to the bottom on the front side of the first washer 104. The front windows 120, 122 and 124 can function as an inlet for receiving soiled eating utensils 112, an outlet for releasing washed eating utensils 113, or both as the inlet and the outlet. The first washer 104 further comprises at least one slit for receiving

soiled trays. For example, the first washer 104 has a first slit 126 vertically aligned with the ground and a second slit 128 horizontally aligned with the ground.

[0045] The first washer 104 may also have other auxiliary devices for convenient operation. For example, a fastener 140 is installed inside the first washer 104 for fixing the first eating utensil carrier 106 inside the first washer 104 during the cleaning process. A pre-washing module 142, a rinsing module 144, a drying module 146 or all may be installed inside the first washer 104. The pre-washing module 142 including a rubbish bin is preferred for removing large food particles from soiled eating utensils 112 before the cleaning process. The pre-washing module 142 is connected with a waste conduit for transferring collected large food particles out of the first washer 104. The rinsing module 144 is installed after the cleaning process for removing soap, detergent or any residues from washed eating utensils 113. The drying module 146 is installed after the rinsing module 144 for removing water or moist such that washed eating utensils are ready to use when they are retrieved out of the first washer 104. The drying module 146 may utilise UV (ultraviolet), infrared, hot air/gas, super-heated steam for drying washed eating utensils 113. The dryer may include one or more blowers, lamps or orifices at diverse locations of the first versatile dishwasher 102 so that parts of whole of the first versatile dishwasher 102 may be dried with different or same capacity.

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[0046] Similarly, the eating utensil carrier 106 may include a first basket 132, a second basket 134 and a third basket 136 for loading with soiled eating utensils 112. The baskets 132, 134 and 136 may have various types of holders where eating utensils of different sizes, shapes and weights can be firmly held by suitable holders. For example, the first basket 132, the second basket 134 and the third basket 136 are detachably

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coupled with the first eating utensil carrier 106 and vertically aligned from the top to the bottom.

[0047] The first door 108 such as a side cover, a side door, an end door or an end cover
5 is detachably coupled with the first eating utensil carrier 106 and the first washer 104.
The first door 108 can be a single unit large enough to fully close the front side opening
114 as a whole. Alternatively, the first door 108 may comprise multiple small pieces; and
each of the multiple small pieces is used for fully closing one of the multiple windows of
the first washer 104. For example, a first piece 148 (not shown) of the first door 108 fully
10 covers the top window 120 of the front side opening 114. The first door 108 further has
a sealing structure 150, such as a mechanical seal, a labyrinth seal or the like for
sealing the first washer 104 with the first door 108 after soiled eating utensils 112 is
transferred into the first washer 104 before the cleaning process starts.

15 [0048] The locking mechanism 130 is used for securing the first door 108 to the first
washer 104 during the cleaning process. The locking mechanism 130 can be a shut-
tight door, a latch or the like. The locking mechanism 130 can either be manually or
automatically (e.g. connected to a computer) operated so that the first door 108 is
prevented from being decoupled when a cleaning process is conducted inside the first
20 washer 104.

[0049] The first control unit 110 is used for regulating any operation of the first versatile
dishwasher 102 and communicating with various external electronic devices. The first
control unit 110 can transmit operation data to a remote computer sever for data analysis
25 and operation monitoring. For example, the control unit includes a warning device 152

for checking status of the first door 108, and a safety mechanism 138 for monitoring the front side opening 114 during the cleaning process. The warning device 152 includes a warning light 154, an audio alarm 156 or the alike. When the first door 104 is not tightly coupled with the first washer 104 or the locking mechanism 130 does not secure the first door 108 to the first washer 104, the warning device 152 would send out a warning signal to the first control unit 110 and an alarm signal to operators. After receiving the warning signal from the warning device 152, the first control unit 110 suspends or stops the cleaning process inside the first washer 104 until the fault indicated by the warning signal is cleared.

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[0050] The first versatile dishwasher 102 may further comprise a guiding mechanism 158 (not shown) for directing the first eating utensil carrier 106 to the first washer 104 for coupling. The guiding mechanism 158 can include wedges, rails, tracks, magnets or other cooperating parts on the first eating utensil carrier 106 and the first washer 104 so that the first eating utensil carrier 106 is easily guided to the first washer 104. For example, the guiding mechanism 158 can comprise two sleeves 160 on the first eating utensil carrier 106, and two rods 162 on the first washer 104. The two rods 162 are transferred into the two sleeves 160 respectively when coupling the first eating utensil carrier 106 and the first washer 104 together such that the first eating utensil carrier 106 and the first washer 104 can be easily joined together for washing the soiled eating utensils 112. The guiding mechanism 158 can provide assistance for aligning the two separated parts (i.e. the first eating utensil carrier 106 and the first washer 104) possibly before their physical contact and/or after their physical contact. Hence, the guiding mechanism 158 allows the ease of joining the first eating utensil carrier 106 and the first washer 104 together, avoiding collision or hard landing.

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[0051] Fig. 2 illustrates the first versatile dishwasher 102 of a static working mode when the first door 108 is disconnected from the first eating utensil carrier 106. The first eating utensil carrier 106 is loaded with soiled eating utensils 112 in the first basket 132, the second basket 134 and the third basket 136. The loaded first basket 132 is transferred into the front top window 120 of the first washer 104; meanwhile, the loaded second basket 134 and the loaded third basket 136 are also transferred into the front middle window 122 and the front bottom window 124 respectively. In this way, the productivity of the first versatile dishwasher 102 is triply enhanced. The baskets 132, 134 and 136 can be either manually carried by operators or moved by an automatic transfer mechanism such as a belt conveyor system. The belt conveyor system may have multiple convey belts for transferring multiple baskets into multiple windows at the same time. For example, the top conveyor belt 164 transfers the first basket 132 to the front top window 120, the middle conveyor belt 166 transfers the second basket 134 to the front middle window 122, and the third conveyor belt 168 transfers the third basket 136 to the front bottom window 124. Alternatively, only one single conveyor belt is needed of the belt conveyor system when the height of the conveyor belt is adjustable to reach each of the front windows 120, 122 and 124 of the first eating utensil carrier 106 when the three front windows 120, 122 and 124 are not working simultaneously.

[0052] Fig. 3 illustrates a second versatile dishwasher of a dynamic working mode in accordance with a second embodiment 200 of the present application. The second versatile dishwasher 202 is similar to the first versatile dishwasher 102 except that a second eating utensil carrier 206 further has a transporter 270 for moving soiled eating utensils 212 on a ground. The transporter 270 is connectable with and detachable from

a second door 208. The transporter 270 can be four-wheelers such as a mobile cart, a mobile dolly and a handcart; three-wheelers; two-wheelers or the other suitable mobile vehicles. For example, the transporter 270 is a free-standing cart with four wheels shown in Fig. 3.

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[0053] Similar to the first door 108, the second door 208 is detachably coupled with the second eating utensil carrier 206 and a second washer 204. However, the multiple baskets 232, 234 and 236 of the eating utensil carrier 206 are not detached from the second door 208 while soiled eating utensils 212 are loaded into the second washer 204.

10 Instead, the second eating utensil carrier 206 as a whole on the transporter 270 is pushed into the second washer 204. The transporter 270 stays inside the second washer 204 in the cleaning process and then moves the second eating utensil carrier 206 out of the second washer 204 loaded with washed eating utensil 213 after the cleaning process is completed. Compared with the first embodiment 100 where the baskets 132, 134 and
15 136 are into the multiple windows 120, 122 and 124 manually by operators or automatically by a belt conveyor system, the transporter 270 in the second embodiment 200 does not need any additional space for installing the belt conveyor system. In addition, it is also more convenient to collect the soiled eating utensils 212 by moving the second eating utensil carrier 206 on the transporter 270 around food centres, hotels
20 or restaurants.

[0054] Fig. 4 illustrates internal structures installed inside the second versatile washer 202 when the loaded second eating utensil carrier 206 is coupled with the second washer 204 in accordance with the second embodiment 200. The second washer 204
25 comprises a fluid circulation mechanism 272 (also known as a washing mechanism 272)

for discharging a cleaning liquid 273 onto the soiled eating utensils 212 during the cleaning process. In detail, the fluid circulation mechanism 272 comprises a top spray arm 274, a middle spray arm 276, a bottom spray arm 278 and a tube 280. The spray arms 274, 276 and 278 are vertically aligned from the top to the bottom. The spray arms 274, 276 and 278 are all connected to the tube 280 such that the cleaning liquid 273 is supplied from the tube 280 to the spray arms 274, 276 and 278 for discharging the cleaning liquid 273.

[0055] Before the cleaning process, the second eating utensil carrier 206 and the transporter 270 are pushed into the second washer 204 as a whole during the cleaning process. Therefore, the second washer 204 needs to be particularly designed to make enough internal space for accommodating the second eating utensil carrier 206. Firstly, the tube 280 is located at a corner 282 of the second washer 204 so as to save internal space of the second washer 204. Secondly, the first basket 232 is fittingly inserted between the top spray arm 272 and the second spray arm 274; the second basket 234 is fittingly inserted between the middle spray arm 274 and the bottom spray arm 276; and the third basket 236 is also fittingly inserted between the bottom spray arm 276 and the top surface of the transporter 270. In this arrangement, the cleaning liquid 273 is discharged from the top spray arm 272, the middle spray arm 274 and the bottom spray arm 276 to the soiled eating utensils loaded in the first basket 232, the second basket 234 and the third basket 236 respectively.

[0056] Fig. 5 illustrates the structures of the spray arms 274, 276 and 278 of the fluid circulation mechanism 272 in details. Each of the spray arms 274, 276 and 278 comprises a spray head, a rotary disc and a rotary tube. The spray arms are vertically

stacked and parallel to each other. For example, a top spray head 284, a top rotary disc 290 and a top rotary tube 296 are coupled as the top spray arm 274 together for spraying the cleaning liquid 273 downwards. In contrast, a middle spray head 286, a middle rotary disc 292 and a middle rotary tube 297 are joined together at their centres for spraying
5 the cleaning liquid 273 upwards. Similarly, a bottom spray head 288, a bottom rotary disc 294 and a middle rotary tube 298 are connected to the fluid circulation mechanism 272 for spraying the cleaning liquid 273 upwards too. All three spray heads 284, 286, 288 are linked to the tube 280 for receiving supply of the clean fluid 273. Alternatively, the middle spray arm 276 can be configured for spraying the cleaning liquid 273
10 downwards, similar to the top spray arm 274. Furthermore, the spray arms 272, 274 and 276 are configured to move (e.g. rotate, swing, shift, shake, vibrate, rock) within a predetermined range (e.g. angle, distance) in order to cover multiple pieces of the soiled eating utensils 210. The loaded baskets 232 and 234 are coupled to and supported by a vertical column 299 from top to bottom. The bottom part of the column 299 is also
15 coupled with the transporter 270.

[0057] Various programs for loading and unloading the eating utensil carrier into the washer are described from Fig. 6 to Fig. 12. The programs that can be adopted by the versatile dishwasher in the present application are not limited to the embodiments shown
20 below.

[0058] Fig. 6 illustrates a front loading and unloading program according to the third embodiment 300 of the present application. The third versatile dishwasher 302 comprises a third washer 304 and a third eating utensil carrier 306 (not shown). The
25 third eating utensil carrier can work under either the static working mode of the first

embodiment 100 or the dynamic working mode of the second embodiment 200. As shown in Fig. 6, the third washer 304 is blocked on both a left side 308 and a right side 310 (not shown). The left side 308 is blocked by a table 312 and a cooker 314 on the lower level, and also by an exhaust hood 316 on the upper level. While the left side 310 is blocked by a wall 318 completely. Therefore, the third washer 304 can only have a front side 320 for loading and unloading if a back side 322 (not shown) of the third washer 304 is also blocked in most food courts, hotels or restaurants. The third washer 304 has a front side opening 324 which has a top window 326, a middle window 328 and a bottom window 330. The third eating utensil carrier 306 has a first basket 332, a second basket 334 and a third basket 336.

[0059] In the third embodiment 300 of the front loading and unloading program, the window can function as an inlet, an outlet, or both. For example, the top window 326 acts as an inlet for receiving a first basket 332; while the middle window 328 acts as an outlet for releasing a second basket 334. Thus a combination of the top window 326 as an inlet and the middle window 328 as an outlet can fulfil the operation of the third versatile dishwasher 302. Alternatively, the bottom window 330 can be both an inlet for receiving a third basket 336 and an outlet for releasing the third basket 336. In addition, the front side 320 also has a slit 332 for receiving a tray 340 into the third washer 304 for being cleaned separately or together with soiled eating utensils.

[0060] Fig. 7 illustrates a side loading and unloading program according to the fourth embodiment 400 of the present application. The fourth versatile dishwasher 402 comprises a fourth washer 404 and a fourth eating utensil carrier 406 (not shown). The fourth eating utensil carrier can work under either the static working mode of the first

embodiment 100 or the dynamic working mode of the second embodiment 200. Similar to the third embodiment 300 of Fig. 6, if the front side 408, the back side 410 (not shown) and the right side 412 are blocked, the left side 414 of the fourth washer 404 are used to receive and release soiled eating utensils. As shown in Fig. 7, the left side 414 has a top window 416, a middle window 418 and a bottom window 420. A first basket 422 loaded with soiled eating utensils is transferred into the top window 416; while a second basket 424 loaded with washed eating utensils is retrieved from the middle opening 418. Thus a combination of the top window 416 as an inlet and the middle window 418 as an outlet can fulfil the operation of the fourth versatile dishwasher 402. Alternatively, the bottom window 420 can be both an inlet for receiving a third basket 426 and an outlet for releasing the third basket 426. In addition, the left side 416 also has a slit 428 (not shown) for receiving a tray 430 into the fourth washer 404 for being cleaned separately or together with soiled eating utensils.

[0061] Fig. 8 illustrates a L-loading and unloading program according to the fifth embodiment 500 of the present application. The fifth versatile dishwasher 502 comprises a fifth washer 504 and a fifth eating utensil carrier 506 (not shown). The fifth eating utensil carrier 506 can work under either the static working mode of the first embodiment 100 or the dynamic working mode of the second embodiment 200. When a back side 508 (not shown) and a back side 510 (not shown) of the fifth washer 504 are blocked, the front side 512 and the left side 514 are used to receive and release soiled eating utensils.

[0062] As shown in Fig. 8, the front side 512 has a front top window 516, a front middle window 518 and a front bottom window 520; while the left side 514 has a left top window

522 and a left middle window 524. A first basket 526 loaded with soiled eating utensils is transferred into the left top window 522 and then retrieved from the front top window 516 after the cleaning process. While a second basket 528 loaded with soiled eating utensils is transferred from the front middle opening 518 and then retrieved from the left middle window 524 after the cleaning process. Thus a combination of the left top window 522 as an inlet and the front top window 516 as an outlet can fulfil the operation of the fifth versatile dishwasher 502. Similarly, a combination of the front top window 516 as an inlet and the left middle window 524 as an outlet can also makes up a L-loading and unloading program 500.

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[0063] The baskets 526 and 528 can be either manually carried by operators or moved by an automatic transfer mechanism 532 such as a belt conveyor system. The belt conveyor system 532 may have multiple convey belts for transferring multiple baskets to multiple windows. For example, a first belt conveyor system 534 can automatically transfer the first basket 526 with soiled eating utensils into the left top window 522. A second belt conveyor system 536 can also automatically receive the second basket 528 with washed eating utensils out of the left middle window 524. Alternatively, one single automatic transfer mechanism 532 is needed if the height of the conveyor belt is adjustable to reach each of the windows 516, 518, 522 and 524.

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[0064] The automatic transfer mechanism 532 may further have a rubbish bin for removing large particles and other food residues. For example, the first belt conveyor system 534 has a rubbish bin 540 located before the left top window 522. Furthermore, the fifth washer 504 also has a silt on the left side, the front side or on both. For example, a slit 540 is located on the front side 512 for receiving soiled a soiled tray 544.

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[0065] In addition to the L- loading and unloading program 500, a front loading and unloading program 300 by transferring soiled eating utensils into and retrieving washed eating utensils out of the front window 520 can also be conducted simultaneously for higher productivity.

[0066] Fig. 9 illustrates a through-passing loading and unloading program according to the sixth embodiment 600 of the present application. The sixth versatile dishwasher 602 comprises a sixth washer 604 and a sixth eating utensil carrier 606 (not shown). The sixth eating utensil carrier can work under either the static working mode of the first embodiment 100 or the dynamic working mode of the second embodiment 200. When a left side 608 and a right side 610 (not shown) of the sixth washer 604 are blocked, the front side 612 and the back side 614 (not shown) are used to receive and release soiled eating utensils.

[0067] As shown in Fig. 9, the front side 612 has a front top window 616 and a front middle window 618; while the back side 614 has a back top window 620 and a back middle window 622. A first basket 624 loaded with soiled eating utensils is transferred into the front top window 616 and then retrieved from the back top window 620 after the cleaning process. While a second basket 626 loaded with soiled eating utensils is transferred from the back middle opening 622 and then retrieved from the front middle window 618 after the cleaning process. Thus a combination of the front top window 616 as an inlet and the back top window 620 as an outlet can fulfil the operation of the sixth versatile dishwasher 602. Similarly, a combination of the back middle window 622 as an

inlet and the front middle window 618 as an outlet can also makes up a through-passing loading and unloading program 600.

[0068] The baskets 624 and 626 can be either manually carrier by operators or moved
5 by an automatic transfer mechanism 628 such as a belt conveyor system. The belt conveyor system 628 may have multiple convey belts for transferring multiple baskets to multiple windows. For example, a first belt conveyor system 630 (not shown) can automatically transfer the first basket 624 with soiled eating utensils into the back top window 620 and then receive the first basket 624 with washed eating utensils out of the
10 front top window 616. A second belt conveyor system 626 can also automatically transfer the second window 626 with soiled eating utensils into the front middle window 618 and then receive the second basket 626 with washed eating utensils out of the back middle window 622. Alternatively, one single automatic transfer mechanism 628 is needed if the height of the conveyor belt is adjustable to reach each of the windows 616, 618, 620 and
15 622.

[0069] The automatic transfer mechanism 628 may further have a rubbish bin for removing large particles and other food residues. For example, the second belt conveyor system 630 has a rubbish bin 634 located before the front middle window 618.
20 Furthermore, the sixth washer 604 also has a silt on the front side, the back side or on both. For example, a slit 636 is located on the front side 612 for receiving soiled a soiled tray 638.

[0070] To further enhance working efficiency of the sixth versatile dishwasher 602,
25 auxiliary washing equipment can also be installed such as a pre-washing module 640

and/or a rinsing module 642 shown in Fig. 10. The pre-washing module 640 is installed between the rubbish bin 634 and the front side 612 as the inlet for removing large food particles from soiled eating utensils. The pre-washing module 640 is connected with a waste conduit 642 for transferring collected large food particles out of the first washer.

5 Satisfactory cleaning effect is achieved to by passing soiled eating utensils through the rubbish bin 634 and the pre-washing module 640. Various cleaning methods can be adopted in the pre-washing module 640 such as water flushing by a water pipe, screening by a mesh, wiping by a brush or their combination. The rinsing module 644 is also installed after the back side 614 for washing washed eating utensils with clean water
10 to remove soap, detergent or any residues. In addition, a drying module 646 can be installed after the rinsing module 644 for removing water or moist such that the eating utensils are ready to use when they are retrieved out of the sixth washer 604. The drying module 604 may utilise UV (ultraviolet), infrared, hot air/gas, super-heated steam for drying washed eating utensils. The dryer may include one or more blowers, lamps or
15 orifices at diverse locations of the sixth versatile dishwasher 602 so that parts of whole of the sixth versatile dishwasher 602 may be dried with different or same capacity.

[0071] Any of the working programs described above can be combined for higher productivity under suitable usage conditions and user's special preferences, i.e. the front
20 loading and unloading program of the third embodiment 300, the side loading and unloading program of the fourth embodiment 400, the L-loading and unloading program of the fifth embodiment 500 and the through-passing loading and unloading program of the sixth embodiment 600.

[0072] According to the seventh embodiment 700 of the present application, Fig. 11 illustrates a seventh versatile dishwasher 702 which combines the side loading and unloading program of the fourth embodiment 400 and the through-passing loading and unloading program of the sixth embodiment 600. To meet a specific working requirement, the two programs can run individually for low capacity or simultaneously for higher productivity. The seventh versatile dishwasher 702 comprises a seventh washer 704 and a seventh eating utensils 706 carrier (not shown). The seventh washer 704 has openings on a front side 708, a back side 710 (not shown) and a left side 712; while the right side 714 (not shown) is blocked. The front side 708 has a front top window 716 and a front middle window 718; and the back side 710 has a back top window 720 (not shown) and a back middle window 722 (not shown) accordingly. While the left side 712 has a left top window 724, a left middle window 726 and a left bottom window 728.

[0073] Similar to the sixth embodiment 600, the front top window 716 as an outlet and the back top window 720 as an inlet constitute up a first through-passing working program 730; while the front middle window 718 as an inlet and the back middle window 722 make up a second through-passing working program 732. Meanwhile, the left top window 724 as an inlet and the left middle window 726 as an outlet integrated into a first side loading and unloading working program 734; while the left bottom window 728 acts as both an inlet and an outlet for the second side loading and unloading working program 736.

[0074] The seventh versatile dishwasher 702 also comprises a first automatic transfer mechanism 738 on the front side 708 and a second automatic transfer mechanism 740 on the left side 712. Both of the automatic transfer mechanisms 738 and 740 have

rubbish bins for a pre-washing purpose. In addition, the seventh washer 704 also has one or more slits 742 for receiving soiled trays 744.

[0075] According to the eighth embodiment 800 of the present application, Fig. 12 illustrates an eighth versatile dishwasher 802 which combines the side loading and unloading program of the fourth embodiment 400, the L-loading and unloading program 500 and the through-passing loading and unloading program of the sixth embodiment 600. To meet a specific working requirement, the three programs can run individually for low capacity or simultaneously for higher productivity. The eighth versatile dishwasher 802 comprises an eighth washer 804 and an eighth eating utensils 806 carrier (not shown). The eighth washer 804 has openings on a front side 808, a back side 810 (not shown) and a left side 812; while the right side 814 (not shown) is blocked. The front side 808 has a front top window 816, a front middle window 818 and a front bottom window 820; and the back side 810 has a back top window 822 (not shown), a back middle window 824 (not shown) and a back bottom window 826. While the left side 812 has a left top window 830 and a left middle window 832.

[0076] Similar to the sixth embodiment 600, the front top window 816 as an inlet and the back top window 822 as an outlet constitute up a through-passing working program 832; while the left middle window 832 as an inlet and the front middle window 818 as an outlet make up a L-loading and unloading working program 834. Meanwhile, the front bottom window 820 and the left top window 830 can act both as an inlet and an outlet for a front loading and unloading working program 836 and a side loading and unloading program 838, respectively. Other auxiliary parts such as a silt, a rubbish bin or an automatic transfer mechanism can be also installed for higher productivity.

[0077] Fig. 13 illustrates a method 1000 of making the versatile dishwasher. Step 1020, a washer with openings suitable for a specific usage condition and user's special preferences is provided. Step 1040, various internal parts are installed, including a fluid
5 circulation mechanism with a spray arm and a tube. Step 1060, an eating utensil carrier with multiple baskets is provided. The baskets are detachably coupled to the eating utensil carrier. The eating utensil carrier can further have a transporter for moving the eating utensil carrier on a ground and specially towards the washer. Step 1080, a door with a sealing structure is provided. Step 1100, various auxiliary parts such as a control
10 unit are also provided and installed to the versatile dishwasher. And Step 1120, a cleaning fluid is made up of detergent and water and supplied to the fluid circulation mechanism.

[0078] Fig. 14 illustrates a method 2000 of using the versatile dishwasher. Step 2020,
15 loading soiled eating utensils into multiple baskets that are further coupled to an eating utensil carrier. Step 2040, moving the eating utensil carrier near a washer manually or via a transporter. Step 2060, coupling the eating utensil carrier to openings of the washer by choosing a static working mode or a dynamic working mode. Step 2080, selecting a loading and unloading working program suitable for a specific usage condition and user's
20 special preferences. Step 2100, closing the openings with a door to which a seal structure is connected. Step 2120, performing the cleaning process with or without a pre-washing process and a rinsing process. Step 2140, disconnecting the seal structure and opening the door. Step 2160, detaching the eating utensil carrier from the washer after washing according to the working mode and the working program previously
25 selected. Step 2180, maintaining the versatile dishwasher periodically.

[0079] In the application, unless specified otherwise, the terms "comprising", "comprise", and grammatical variants thereof, intended to represent "open" or "inclusive" language such that they include recited elements but also permit inclusion of additional, non-
5 explicitly recited elements.

[0080] As used herein, the term "about", in the context of concentrations of components of the formulations, typically means +/- 5% of the stated value, more typically +/- 4% of the stated value, more typically +/- 3% of the stated value, more typically, +/- 2% of the
10 stated value, even more typically +/- 1% of the stated value, and even more typically +/- 0.5% of the stated value.

[0081] Throughout this disclosure, certain embodiments may be disclosed in a range format. The description in range format is merely for convenience and brevity and should
15 not be construed as an inflexible limitation on the scope of the disclosed ranges. Accordingly, the description of a range should be considered to have specifically disclosed all the possible sub-ranges as well as individual numerical values within that range. For example, description of a range such as from 1 to 6 should be considered to have specifically disclosed sub-ranges such as from 1 to 3, from 1 to 4, from 1 to 5, from
20 2 to 4, from 2 to 6, from 3 to 6 etc., as well as individual numbers within that range, for example, 1, 2, 3, 4, 5, and 6. This applies regardless of the breadth of the range.

[0082] It will be apparent that various other modifications and adaptations of the application will be apparent to the person skilled in the art after reading the foregoing
25 disclosure without departing from the spirit and scope of the application and it is intended

that all such modifications and adaptations come within the scope of the appended claims.

[0083] A versatile dishwasher comprises a washer, an eating utensil carrier and a door.

5 The washer is used for cleaning soiled eating utensils; the eating utensil carrier is designed for detachably coupling with the washer in order to hold the soiled eating utensils during cleaning and/or collect the soiled eating utensils outside the washer; and the door is installed with a sealing structure, such as a mechanical seal, labyrinth seal for sealing the eating utensil carrier during the cleaning process. The washer further has
10 at least one opening for receiving as an inlet and/or releasing as an outlet the eating utensil carrier. The eating utensil carrier further has a transporter for moving the soiled eating utensils on a ground. Other components are also available to the versatile dishwasher for higher productivity and/or easier operation. in addition, methods of making and using the versatile dishwasher are also disclosed in the subject application.

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Claims

1. A versatile dishwasher comprising:

- a washing station for cleaning eating utensils, the washing station having
5 at least one inlet for receiving a first batch of eating utensils and at least one outlet for discharging cleaned eating utensils; and
- a carrier configured to couple with the washing station for fetching eating utensils with the washing station or collecting a second batch of eating utensils after being detached from the washing station.

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2. The versatile dishwasher of claim 1 further comprising

at least one door for closing an opening of the washing station during the cleaning process.

15 3. The versatile dishwasher of claim 2, wherein

the at least one door is detachable from the washing station, the carrier or both the washing station and the carrier.

4. The versatile dishwasher of claim 1, wherein

20 wherein the carrier comprises at least rack for carrying at least one basket in order to hold the eating utensils.

5. The versatile dishwasher of claim 4, wherein

25 the at least one rack is adjustable for fetching the eating utensils from the washing station.

6. The versatile dishwasher of claim 1, wherein
the at least one inlet comprises a first inlet and a second inlet for receiving soiled
eating utensils independently.

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7. The versatile dishwasher of claim 1, wherein
the at least one outlet comprises a first outlet and a second outlet for discharging
cleaned eating utensils.

- 10 8. The versatile dishwasher of Claim 1 further comprising
a locking mechanism for fastening a part of the washing station.

9. The versatile dishwasher of Claim 8, wherein
the locking mechanism comprises a shut-tight door, a latch or both.

15

10. The versatile dishwasher of Claim 1 further comprising
a warning device for alerting operating status.

11. An adaptable dishwasher comprising:
20 a washer for cleaning eating utensils, the washer comprising a first inlet, a second
inlet, a first out outlet and a second outlet;
wherein the washer is configured to transfer the eating utensils from one of the
inlets to one of the outlets for cleaning.