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(54) **CONVEYOR DISHWASHER**

BANDSPÜLMASCHINE

LAVE-VAISSELLE DE CONVOYEUR

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Description

[0001] The invention relates to a conveyor dishwasher and, in particular, to a conveyor dishwasher having at least one wash zone and at least one final rinse zone and also having a conveyor apparatus for conveying washware through the at least one wash zone and the at least one final rinse zone.

[0002] The conveyor dishwasher according to the invention is, in particular, a commercial conveyor dishwasher and can be in the form of a flight-type dishwasher (flight-type warewasher) or a rack-conveyor dishwasher (rack-conveyor warewasher).

[0003] Conveyor dishwashers (conveyor warewashers) are used in the commercial sector. In contrast to domestic dishwashers, in which the washware to be cleaned remains stationary in the machine during cleaning, in conveyor dishwashers the washware is conveyed through various treatment zones of the machine.

[0004] The document US 6,026,831 A relates to a dishwasher capable of simultaneously washing trays and dishware. The single unit washer has a dual conveyor system. One conveyor transports trays through the washer and another conveyor transports racks containing dishware and drinking vessels.

[0005] The document DE 24 39 836 A1 relates to a commercial dishwasher for cleaning cups, cutlery parts and trays or plates. The dishwasher comprises a first conveyer belt for the cups, a second conveyer belt for the cutlery parts and a third conveyer belt for the trays or plates.

[0006] The document GB 2 155 772 A relates to a machine for washing trays. The machine comprises an inlet section into which trays are introduced, a conveyor for conveying the trays along an ascending path, a wash zone in which the trays are washed by jets of wash liquid, a rinse zone in which the trays are rinsed by jets of liquid, and a drying zone in which the trays are dried by means of heated air.

[0007] In the case of conveyor dishwashers, the washware, for example trays, tableware, pots, glasses, cutlery and other articles which are to be cleaned, is conveyed through a plurality of treatment zones, for example prewash zone(s), main wash zone(s), postwash or prerinse zone(s), final rinse zone(s) and drying zone(s). A conveyor apparatus which generally has compartments for holding washware is used to convey washware in a conveying direction through the conveyor dishwasher. In the case of a flight-type dishwasher, the compartments can be formed by supporting fingers on a conveyor belt of the conveyor apparatus. In the case of rack-conveyor dishwashers, dish racks in which compartments can be formed in order to hold the washware to be treated serve as the conveyor apparatus. It is feasible here for the dish racks to be conveyed through the rack-conveyor dishwasher by a conveying device.

[0008] The washware to be cleaned is usually presorted before being placed on the conveyor belt. For example, US 6,530,996 B2 discloses a rack-conveyor dishwasher in which the washware to be treated is fed to the respective treatment zones in a state in which it is presorted in dish racks.

[0009] With regard to tray or tray-like articles, the presorting process is usually performed by the set of tableware and cutlery being removed from a tray to be cleaned and the tray then being stacked in front of the conveyor apparatus or in the feed region (dirty side) of the conveyor dishwasher. The trays from this stack of trays are from time to time placed, in manner sorted by type, in the conveyor belt of the dishwasher and cleaned. This procedure of sorting by type has the advantage that trays cannot cast spray shadows over smaller items of washware which have been stacked behind the trays. Furthermore, this procedure greatly simplifies the sequence of work for stacking and destacking and makes it more efficient in comparison to mixing the washware with the trays to be cleaned.

[0010] However, while the trays from this stack of trays are placed, in a manner sorted by type, in the conveyor belt of the dishwasher and cleaned, it is not possible to clean other washware, for example plates, bowls or other tableware, since the trays which are to be placed in the conveyor belt usually have to be placed in the conveyor belt transverse to the conveying direction and therefore take up all the available surface area of the conveyor belt. Therefore, a relative large amount of time is required to clean trays in comparison to other types of washware.

[0011] Furthermore, the operating personnel of the conveyor dishwasher at the machine inlet have to include each tray twice in their sequence of work: the first time when removing the items of cutlery and tableware from the tray to be cleaned and the second time when actually placing the tray in the conveyor belt of the conveyor dishwasher.

[0012] On the basis of this problem, the object of the present invention is to develop a conveyor dishwasher of the type cited in the introductory part in such a way that this enables the entire washing and rinsing process to be made more efficient, as a result of which, in particular, the working time of the dishwashing personnel can be reduced and the consumption of resources by the dishwasher can be reduced.

[0013] According to the invention, this object can be achieved by the subject matter claimed below.

[0014] In this regard, a typical tray or tray-like item of washware has a lengthwise dimension and a widthwise dimension, where the widthwise dimension is smaller than the lengthwise dimension. The end edges of the tray or tray-like washware item define the lengthwise dimension and the sides edges of the tray or tray-like washware item define the widthwise dimension.

[0015] In accordance with the subject matter, the invention proposes that the conveyor apparatus of the conveyor dishwasher has a first conveyor belt for trays or tray-like washware, and a second conveyor belt, which runs parallel to the first conveyor belt, for other washware,

with the first conveyor belt having a width which is reduced in comparison to the second conveyor belt in such a way that a tray or a tray-like item of washware can be held by the first conveyor belt only when it is in a state in which it is placed on edge and is oriented parallel to the conveying direction.

[0016] The tray or tray-like washware may typically be placed on either an end edge or a side edge on the first conveyor belt. The tray or tray-like washware item is considered oriented parallel to the conveying direction if either the lengthwise dimension or the widthwise dimension of the tray or tray-like washware item runs substantially paralallel to the conveying direction.

[0017] The term "width of the conveyor belt" used here is to be understood to mean the horizontal extent of the conveyor belt transverse, that is to say perpendicular, to the conveying direction.

[0018] Since a separate conveyor belt (first conveyor belt) is provided in the conveyor dishwasher according to the invention for trays or tray-like articles, it being possible for trays or tray-like articles to be in a state in which they are placed on edge and are oriented parallel to the conveying direction in the conveyor belt, it is possible for the trays or tray-like articles to be cleaned with other washware at the same time, without the risk of the trays or tray-like articles casting a spray shadow on the washware which is to be cleaned at the same time as the trays or tray-like articles during cleaning.

[0019] Furthermore, the orientation of the trays or tray-like articles parallel to the direction in which the first and second conveyor belts run results in minimal utilization of the surface area of the total belt surface area. This minimal utilization of surface area means that the second conveyor belt, which is provided for the other washware, can continue to be used virtually without restriction. Both racks of glasses and GN containers can be placed on the second conveyor belt next to a tray which is disposed on the first conveyor belt.

[0020] Therefore, the arrangement of two conveyor belts reduces the length of the overall washing and rinsing process in a commercial scullery and therefore reduces the working time of the dishwashing personnel and also, secondly, reduces the consumption of resources by the conveyor dishwasher.

[0021] In a preferred embodiment of the solution according to the invention, provision is made for the conveying speed of the first conveyor belt to be increased relative to the conveying speed of the second conveyor belt. This increase in the conveying speed enables each tray to be placed in position, without delay, at the time at which all the items of cutlery and tableware are removed from the tray. Accordingly, it is possible for the trays to not be deposited in a stack after the items of tableware and cutlery possibly present on the tray are removed from them, but rather for the trays to be placed directly into the first conveyor belt. Therefore, a second working step involving the respective tray is dispensed with in this embodiment. Automatic destacking of trays at the machine outlet is likewise preferred for this machine configuration since, under certain circumstances, the operating personnel at the machine outlet may be unable to cope with destacking the conveyor dishwasher on account of the cleaning processes running in parallel on the two conveyor belts.

[0022] The concept of providing a separate conveyor belt for specific types of washware can be extended as desired and various combinations of individual conveyor belts are possible. Therefore, in a preferred embodiment of the solution according to the invention, provision is also made for at least one further conveyor belt, which runs parallel to the first and second conveyor belts, to be used, with this further conveyor belt preferably being provided for items of cutlery. In this case, it is preferred when the further conveyor belt which is provided for items of cutlery runs directly next to the first conveyor belt and between the first and second conveyor belts. In this embodiment, it is no longer necessary for the operator of the conveyor dishwasher to manually remove the set of cutlery from the respective tray at the machine inlet. Since the tray is placed on edge in order to be fed and placed on the first conveyor belt, the set of cutlery falls automatically - driven by the force of gravity - from the upended tray into the cutlery lane (further conveyor belt) and likewise into a provided container after washing and drying. Therefore, the handling actions for the cutlery are completely dispensed with.

[0023] Furthermore, special lanes for individual types of washware, for example plates and/or bowls, can be provided since automatic destacking systems for all these types of washware are already known from semi- and fully automatic technology. On account of the degree of automation which is increased by virtue of these special lanes in conjunction with automated destacking, working time can be saved both at the clean end and at the dirty end of the conveyor dishwasher. The dishwashing process therefore runs more efficiently and its overall length is reduced, so that, in addition to working time, resources can be saved.

[0024] The invention will be described below by way of example on the basis of various embodiments and with reference to the drawings. Parts which are the same or have the same functions are provided with the same reference numerals here.

[0025] In the drawings:

Fig. 1 shows a schematic longitudinal view of a conveyor dishwasher in which a conveyor apparatus according to the invention can be used to treat (clean and dry) a plurality of types of washware, which are arranged next to one another, at the same time;

Fig. 2a shows a plan view of a sub-region of a first exemplary embodiment of a conveyor apparatus which can be used in a conveyor dishwasher according to Fig. 1;

Fig. 2b shows a cross-sectional view of the conveyor apparatus according to Fig. 2a;

Fig. 3a shows a plan view of a sub-region of a second exemplary embodiment of a conveyor apparatus which can be used in a conveyor dishwasher according to Fig. 1;

Fig. 3b shows a cross-sectional view of the conveyor apparatus according to Fig. 3a;

Fig. 4a shows a plan view of a sub-region of a third exemplary embodiment of a conveyor apparatus which can be used in a conveyor dishwasher according to Fig. 1; and

Fig. 4b shows a cross-sectional view of the conveyor apparatus according to Fig. 4a.

[0026] Fig. 1 shows a schematic longitudinal view of an exemplary embodiment of a conveyor dishwasher 1 in which a conveyor apparatus 2 is used for conveying washware (not illustrated in Fig. 1) through the conveyor dishwasher 1 in a conveying direction T. As will be described later with reference to the illustrations in Figures 2 to 4, the conveyor apparatus 2 is designed, according to the invention, to treat (clean and dry) a plurality of types of washware, which are arranged next to one another, at the same time, in order to thus make the entire washing and rinsing process more efficient, as a result of which, in particular, the working time of the dishwashing personnel can be reduced and the consumption of resources by the dishwasher can be reduced.

[0027] As can be seen in the illustration in Fig. 1, the conveyor dishwasher 1 according to the exemplary embodiment has at least one wash zone (as illustrated in Fig. 1 for example), a prewash zone 10 and two main wash zones 11.1, 11.2 which are arranged downstream of the prewash zone 10 as seen in the conveying direction T.

[0028] As seen in the conveying direction T, a postwash zone 12 is arranged downstream of the at least one wash zone 10, 11.1, 11.2, and at least one final rinse zone, for example only a single final rinse zone 13 as illustrated, is arranged downstream of the postwash zone 12. In the conveyor dishwasher 1 illustrated in Fig. 1, the final rinse zone 13 is followed in the conveying direction T of the washware by a drying zone 14.

[0029] The respective zones 10, 11.1, 11.2, 12, 13, 14 of the conveyor dishwasher 1 can be separated from one another by means of separating curtains 5. In the embodiment illustrated in Fig. 1, the inlet tunnel 3 of the conveyor dishwasher 1 itself is also separated from the inlet 4 by means of a separating curtain 5. The provision of the separating curtains 5 prevents wash liquid and final rinse liquid spraying between zones and prevents vapours escaping from the conveyor dishwasher 1.

[0030] The treatment zones 10, 11.1, 11.2, 12, 13 of the conveyor dishwasher 1 have associated spray nozzles 30a, 30b, 31.1a, 31.1b, 31.2a, 31.2b, 32a, 32b, 33a, 33b, 33c. These spray nozzles 30a, 30b, 31.1a, 31.1b, 31.2a, 31.2b, 32a, 32b, 33a, 33b, 33c serve to spray liquid onto the washware which is to be treated as the washware is conveyed through the respective treatment zones 10, 11.1, 11.2, 12, 13 by the conveyor apparatus 2. The individual spray systems of the treatment zones 10, 11.1, 11.2, 12, 13 ensure that the washware which is to be treated is hosed down both from the top and from the bottom.

[0031] However, in the conveyor dishwasher 1 schematically illustrated in Fig. 1, the final rinse zone 13 not only has downwardly directed upper spray nozzles 33a and upwardly directed lower spray nozzles 33b, but also transversely directed lateral final rinse nozzles 33c on either side of the conveyor apparatus 2. The use of lateral final rinse nozzles 33c permits areas of the washware (areas of the tableware) to be sprayed with final rinse liquid in a targeted manner in shadow zones too. The use of lateral final rinse nozzles 33c in the final rinse zone 13 has a significant advantage in terms of the final rinse result (effective rinsing-off of detergent residues from surfaces of the tableware in shadow zones too) compared to systems in which only upper and lower final rinse nozzles 33a, 33b and no transversely directed lateral final rinse nozzles 33c are provided in the final rinse zone 13, specifically when the conveying system is fully loaded, for example with plate-to-plate loading of the dish rack.

[0032] The postwash or prerinse zone 12, main wash zones 11.1, 11.2 and prewash zone 10 also have associated tanks (postwash tank 22, main wash tank 21.1, 21.2, prewash tank 20) for accommodating sprayed liquid and/or for providing liquid for the spray nozzles 30a, 30b, 31.1a, 31.1b, 31.2a, 31.2b, 32a, 32b of the relevant treatment zones 10, 11.1, 11.2, 12.

[0033] As already indicated, final rinse liquid, which comprises fresh water with rinse aid which is added in a metered fashion, is sprayed onto the washware (not illustrated) by means of final rinse nozzles 33a, 33b, 33c which are arranged above and below the conveyor apparatus 2 and on the side in the conveyor dishwasher 1 illustrated in Fig. 1. A portion of the sprayed final rinse liquid is conveyed from treatment zone to treatment zone via a cascade system in the opposite direction to the conveying direction T of the washware. The remaining portion of the final rinse liquid sprayed in the final rinse zone 13 is conducted directly to the prewash tank 20 which is associated with the prewash zone 10 via a valve V1 and a bypass line 6.

[0034] In the cascade system, the final rinse liquid sprayed by the final rinse nozzles 33a, 33b, 33c flows from the final rinse zone 13 into the postwash tank 22, which is associated with the postwash zone 12, due to the force of gravity. The final rinse liquid sprayed in the final rinse zone 13 and collected by the postwash tank 22 is then delivered to the spray nozzles of the postwash zone 12 (upper and lower postwash nozzles 32a, 32b)

with the aid of a postwash pump 36.

[0035] Wash liquid is rinsed off from the washware in the postwash zone 12. The liquid (postwash liquid) produced in the process flows into the first main wash tank 21.1, which is associated with the first main wash zone 11.1, due to the force of gravity. A discharge element 7, for example a discharge base or a baffle plate, which conducts the postwash liquid sprayed by the postwash nozzles 32a, 32b into the main wash tank 21.1 is preferably provided for this purpose. According to another embodiment (not illustrated) of the conveyor dishwasher 1, the outlet element 7 can be dispensed with if the main wash tank 21.1 extends as far as beneath the postwash nozzles 32a, 32b of the postwash zone 12.

[0036] The liquid accommodated by the main wash tank 21.1 of the first main wash zone 11.1 is usually provided with a detergent and sprayed onto the washware by means of the spray nozzles of the first main wash zone 11.1 (upper and lower main wash nozzles 31.1a, 31.1b) with the aid of a first main wash pump 35.1. The wash liquid which is sprayed by the main wash nozzles 31.1a, 31.1b then flows back into the main wash tank 21.1 due to the force of gravity.

[0037] The main wash tank 21.1 is fluidically connected to the main wash tank 21.2, which is associated with the second main wash zone 11.2, via an overflow line 9.1. The wash liquid which is sprayed in the first main wash zone 11.1 enters the main wash tank 21.2 of the second main wash zone 11.2 via this overflow line 9.1 when there is a sufficient quantity of wash liquid in the main wash tank 21.1 of the first main wash zone 11.1.

[0038] The liquid accommodated by the main wash tank 21.1 of the second main wash zone 11.2 is sprayed onto the washware by means of the spray nozzles of the second main wash zone 11.2 (upper and lower main wash nozzles 31.2a, 31.2b) with the aid of a second main wash pump 35.2. The wash liquid which is sprayed by the main wash nozzles 31.2a, 31.2b then flows back into the main wash tank 21.2 of the second main wash zone 11.2 due to the force of gravity.

[0039] The main wash tank 21.2 of the second main wash zone 11.2 is fluidically connected to the prewash tank 20 which is associated with the prewash zone 10 via an overflow line 9.2. The wash liquid which is sprayed in the second main wash zone 11.2 enters the prewash tank 20 via this overflow line 9.2 when there is a sufficient quantity of wash liquid in the main wash tank 21.2 of the second main wash zone 11.2.

[0040] The liquid accommodated in the prewash tank 20 of the prewash zone 10 is then sprayed onto the washware by means of the spray nozzles of the prewash zone 10 (upper and lower prewash nozzles 30a, 30b) with the aid of a prewash pump 34, in order to remove coarse particles of dirt from the washware. The wash liquid which is sprayed by the prewash nozzles 30a, 30b then flows back into the prewash tank 20 due to the force of gravity.

[0041] The prewash tank 20 is provided with an overflow line 8 which is used to feed the excess quantity of liquid to a waste water system if a specific liquid level in the prewash tank 20 is exceeded.

[0042] As already indicated, the liquid which is sprayed in the main wash zones 11.1, 11.2 and in the prewash zone 10 preferably contains detergent which is added in a metered fashion with the aid of a detergent metering apparatus (not shown in the drawings), for example, to the liquid which is accommodated in the main wash tank 21.1 of the first main wash zone 11.1.

[0043] As already mentioned, the final rinse zone 13 is followed by the drying zone 14 in the conveying direction T. In the drying zone 14, the washware is dried using dry and heated air in order to blow off and/or dry up the moisture on the washware. In order to keep the moisture content of the air in a range which is expedient for drying, it is feasible, for example, to supply external room air to the drying zone 14 via an opening, for example through the outlet opening for the washware.

[0044] The warm and moisture-laden air in the drying zone 14 is then drawn-off from the drying zone 14 via a further opening, for example with the aid of a fan 15. It is advantageous here if the exhaust-air stream from the drying zone 14 passes a heat recovery device 16 in which, for example, a condenser can be provided. The heat recovery device 16 serves to recover at least some of the thermal energy contained in the exhaust air. This recovered thermal energy can be used, for example, to heat the liquid which is to be sprayed in the final rinse zone 13.

[0045] If, before initial starting of the conveyor dishwasher 1, the tanks (prewash tank 20, main wash tank 21.1, 21.2, postwash tank 22) which are associated with the treatment zones 10, 11.1, 11.2, 12 are empty or insufficiently filled, the tanks first have to be filled via a fresh water line 18 and/or by spraying final rinse liquid in the final rinse zone 13. The fresh water line 18 can be connected to a fresh water supply system via an actuable valve V3. The quantity of wash liquid available in the main wash zones 11.1, 11.2 and in the prewash zone 10 can in each case be monitored and signalled to a control device 40 with the aid of a level sensor which is provided in the main wash tank 21.1, 21.2 of the first and/or second main wash zone 11.1, 11.2 and with the aid of a level sensor which is provided in the prewash tank 20.

[0046] The final rinse zone 13 can - as illustrated in Fig. 1 - have an associated fresh water container 23 for temporarily storing at least a portion of the fresh water which is provided for final rinsing purposes. The fresh water container 23 is firstly provided with a fresh water connection which can be connected to a fresh water supply system via an actuable fresh water feed valve V2. Secondly, the fresh water container 23 is connected to the intake end of a final rinse pump 37.

[0047] The delivery end of the final rinse pump 37 is connected to the upstream end region 47 of a main line system 44 by means of which fresh water is conveyed from the fresh water container 23 to the final rinse nozzles

33a, 33b, 33c when the final rinse pump 37 is operated. Specifically, the main line system 44 connects the delivery end of the final rinse pump 37 to a water heater 17 (boiler). In this case, the main line system 44 is designed in such a way that the liquid which is supplied from the final rinse pump 37 to the final rinse nozzles 33a, 33b, 33c first passes the heat recovery device 16 before reaching the water heater 17. In this way, it is possible to use at least some of the thermal energy of the exhaust air which is discharged to the drying zone 14 to heat up the liquid which is supplied to the spray nozzles 33a, 33b, 33c via the main line system 44.

[0048] Various embodiments of conveyor apparatuses 2 for conveying washware through the conveyor dishwasher 1 which is schematically illustrated in Fig. 1 will be described below with reference to the illustrations in Figures 2a to 4b.

[0049] Specifically, Figures 2a and 2b schematically show a region of a first exemplary embodiment of a conveyor apparatus 2 which is suitable for use in a conveyor dishwasher 1 according to the illustration in Fig. 1. In this case, Fig. 2a shows a plan view of the machine outlet-end region of the conveyor apparatus 2, while Fig. 2b illustrates the corresponding cross-sectional view.

[0050] Accordingly, the conveyor apparatus 2 which is illustrated in Figures 2a and 2b has a first conveyor belt 50 for trays or tray-like washware 100 and also a second conveyor belt 51, which runs parallel to the first conveyor belt 50, for other washware, in particular plates 101, bowls 102 and/or cutlery 103. The first conveyor belt 50 is relatively narrow in comparison with the second conveyor belt 51, and therefore a tray or tray-like item 100 of washware can be held by the first conveyor belt 50 only in a state in which it is placed on edge and is oriented parallel to the conveying direction T. The orientation of the washware 100 which is to be held by the first conveyor belt 50 parallel to the direction in which the first conveyor belt 50 runs results in minimal utilization of the surface area of the total belt surface area. In other words, the first conveyor belt 50 has a width which is reduced in such a way that only a minimal surface area of the total belt surface area is occupied by the first conveyor belt 50, this specifically permitting trays or tray-like washware 100 to be placed in position when this washware 100 is in a state in which it is placed on edge and is oriented parallel to the conveying direction T.

[0051] This means that it is possible for the second conveyor belt 51, as before, to have a sufficient width in order to continue to be able to be used almost without restriction for conveying other washware, in particular plates 101, bowls 102 and/or cutlery 103, through the individual treatment zones of the conveyor dishwasher 1. Therefore, for example, racks of glasses or GN containers can, as before, also be placed on the second conveyor belt 51 next to the tray or tray-like item 100 of washware which is held on the first conveyor belt 50.

[0052] In the embodiment which is illustrated in Figures 2a and 2b, a tray 100 and two plates 101 are arranged next to one another merely as an example, with the tray 100 being disposed on the first conveyor belt 50 of the conveyor apparatus 2 and the plates 101 being disposed on the second conveyor belt 51 of the conveyor apparatus 2. In this embodiment, the plates 101 are retained on the second conveyor belt 51 with the aid of compartments, with these compartments being formed by supporting fingers 63 which are provided on the second conveyor belt 51.

[0053] As already indicated, the second conveyor belt 51 has - despite the provision of a first conveyor belt 50 which runs parallel to the second conveyor belt 51 - a sufficient width to also be able to accommodate conventional racks of glasses etc. This is achieved without the conveyor dishwasher 1 having to have a conveyor apparatus 2 which is wider overall.

[0054] The solution according to the invention therefore allows both trays or tray-like washware 100 and other washware, in particular plates 101, bowls 102 and/or cutlery 103, to be cleaned at the same time. Therefore, cleaning processes which proceed in parallel can be implemented on both conveyor belts 50, 51, this ultimately reducing the total length of the washing and rinsing process in a commercial scullery. This in turn reduces the working time of the dishwashing personnel and leads to a reduction in the consumption of resources by the conveyor dishwasher 1.

[0055] As can be seen in the illustration in Fig. 2b in particular, the first conveyor belt 50 is designed to hold trays or tray-like washware 100 in the exemplary embodiment of the conveyor apparatus 2, with this washware being supported on the first conveyor belt surface by means of a border or edge region 100'. In order to securely retain the tray-like washware 100 which is held on the first conveyor belt 50 and is placed on edge, it is advantageous, in particular, if a guide which is associated with the first conveyor belt 50 is provided. This guide preferably serves not only to retain the washware 100 on the first conveyor belt 50, but also to guide the washware 100 which is held on the first conveyor belt 50 as it is conveyed through the respective treatment zones of the conveyor dishwasher 1.

[0056] In the embodiment of the conveyor apparatus 2 which is illustrated in Figures 2a and 2b, a guide of this kind is implemented in the form of a lower guide groove at one end and in the form of an upper guide rail at the other end. The illustration in Fig. 2b shows, in particular, that a guide groove 60, which is formed in the first conveyor belt 50 and runs in the longitudinal direction of the first conveyor belt 50, is designed to guide and retain the tray-like item 100 of washware which is held on the first conveyor belt 50. This guide groove 60 serves to hold a border or edge region 100' of a tray or tray-like item 100 of washware which is placed on the first conveyor belt 50.

[0057] In addition to the (lower) guide groove, 60, an upper guide element 61, which is situated opposite the first conveyor belt 50 and is implemented as a guide rail in this case, is used in the embodiment which is illustrated

in Figures 2a and 2b. As indicated in Fig. 2b, this guide element 61 is designed to hold a region 100" of a tray or tray-like item 100 of washware which is placed on the first conveyor belt 50 and to guide the washware 100 as it is conveyed through the individual treatment zones of the conveyor dishwasher 1. It is clear that the washware 100 which is placed on edge on the first conveyor belt is securely retained on the first conveyor belt 50 on account of the provision of the lower guide groove 60 and of the upper guide element 61.

[0058] As can be seen in the illustration in Fig. 2b, the upper guide element 61 is preferably designed to hold a region 100" of the tray or tray-like item 100 of washware which is placed on the first conveyor belt 50, which region 100" is situated opposite the border or edge region 100' by means of which the tray or tray-like item 100 of washware is supported on the first conveyor belt 50.

[0059] In order to be able to hold trays or tray-like washware with different dimensions on the first conveyor belt 50, it is advantageous if the upper guide element 61 is adjustable in the vertical direction. In this way, the upper guide element 61, in a manner which is simple to implement, can be matched to the height of a tray or tray-like item 100 of washware which is to be held by the first conveyor belt 50 and is placed on edge. Accordingly, the first conveyor belt 50 is suitable firstly for holding trays 100 which are supported on the first conveyor belt 50 by means of their longitudinal side edge, and secondly for holding trays 100 which are supported on the first conveyor belt 50 by means of their transverse side edge. Therefore, the first conveyor belt 50 can be used flexibly for various applications.

[0060] The illustration in Fig. 2b, in particular, shows that a belt guide 62 which is associated with the first conveyor belt 5 is provided in the exemplary embodiment of the conveyor apparatus 2 which is schematically shown in said illustration. A belt guide 62 of this kind is advantageous, in particular, when - as in the embodiment which is illustrated in Figures 2a and 2b - the first conveyor belt 50 is in the form of an endless drive belt. The provision of a belt guide 62 of this kind ensures, in a simple to implement yet effective manner, that the first conveyor belt 50 always runs parallel to the second conveyor belt 51. Furthermore, it has proven advantageous if the first conveyor belt 50 is in the form of a flat belt, a V-belt, a toothed belt or a round belt, in order to provide additional guidance of the first conveyor belt 50.

[0061] As indicated in Fig. 2b, the belt guide 62 which is associated with the first conveyor belt 50 can be fixed, for example, to belt rod shafts 55 of the second conveyor belt 51, as a result of which the conveyor apparatus 2 is provided with a compact design. However, it goes without saying that other embodiments for fixing the belt guide 62 are feasible.

[0062] As already cited, a guide groove 60, which is formed in the first conveyor belt 50 and runs in the longitudinal direction of the first conveyor belt 50, is provided in the embodiment which is illustrated in Figures 2a and 2b, it being possible for a border or edge region 100' of a tray or tray-like item 100 of washware which is placed on the first conveyor belt 50 to be held in the guide groove in order to guide the washware 100 which is placed on edge on the first conveyor belt 50 as it is conveyed through the respective treatment zones of the conveyor dishwasher 1. However, instead of a guide groove 60 of this kind, it is also feasible for the belt guide 62 to be used to not only guide the first conveyor belt 50, but also the washware 100, which is placed on the first conveyor belt 50, as it is conveyed through the respective treatment zones of the conveyor dishwasher 1. If - as illustrated in Fig. 2b - the belt guide 62 is in the form of a vertically oriented guide face, this vertically oriented guide face can, at the same time, serve as a stop face for a border or edge region 100' of a tray or tray-like item 100 of washware which is held on the first conveyor belt 50 and is placed on edge. Although not illustrated in the drawings, it is therefore feasible for the border or edge region 100' of the tray or tray-like item 100 of washware which is held on the first conveyor belt 50 and is placed on edge to be supported on the vertically oriented guide face of the belt guide 62, this enabling the washware 100 which is held on the first conveyor belt 50 to be guided through the respective treatment zones of the conveyor dishwasher 1.

[0063] In one possible implementation, the upper guide element 61 is in the form of a guide rail. This guide rail preferably runs in such a way that a tray or tray-like item 100 of washware, which is held on the first conveyor belt 50, is transferred from its state in which it is placed on edge to its horizontally oriented normal state and then destacked at the outlet of the conveyor dishwasher 1, that is to say downstream of the at least one final rinse zone 13 as seen in the conveying direction T. In this embodiment, the tray or tray-like washware 100 which was originally held on the first conveyor belt 50 is therefore automatically destacked at the machine outlet, this enabling a further reduction in operating personnel at the machine outlet.

[0064] It is preferred, in principle, if the first conveyor belt 50, which is provided for conveying trays or tray-like washware 100, has a higher conveying speed in comparison to the second conveyor belt 51 which is provided for other washware. The increase in the conveying speed enables the trays or the tray-like washware 100 to be placed in position, without delay, at the time at which all the items of cutlery and tableware are removed from the tray. Therefore, the trays 100 are not deposited in a stack after the items of tableware and cutlery are removed, but rather are placed directly into the first conveyor belt 50. Therefore, a second working step with the respective tray 100 is dispensed with in this embodiment.

[0065] In a preferred implementation of the last-mentioned embodiment, provision is made for a common drive apparatus to be provided for the first and second conveyor belts 50, 51, the first and second conveyor belts 50, 51 being jointly driven by means of the common drive

apparatus. The provision of a common drive apparatus simplifies the overall design of the conveyor dishwasher.

[0066] In order to be able to implement different conveying speeds in a common drive apparatus for the first and second conveyor belts 50, 51, it is feasible for the first conveyor belt 50 to be connected to the common drive apparatus by means of a first drive shaft which is associated with the first conveyor belt 50 and a first gear mechanism apparatus which is associated with the first conveyor belt 50, while the second conveyor belt 51 is connected to the common drive apparatus by means of a second drive shaft which is associated with the second conveyor belt 51 and a second gear mechanism apparatus which is associated with the second conveyor belt 51. The respective transmission ratio of the first and the second gear mechanism apparatus is preferably selected in such a way that the conveying speed at which an item 100 of washware which is held by the first conveyor belt 50 is conveyed through the respective treatment zones of the conveyor dishwasher 1 is higher than the conveying speed at which an item 100 of washware 101, 102, 103 which is held by the second conveyor belt 51 is conveyed through the respective treatment zones of the conveyor dishwasher 1.

[0067] However, as an alternative to this, it goes without saying that it is also possible to provide an associated drive apparatus for each conveyor belt 50, 51 for the purpose of driving the corresponding conveyor belt 50, 51 in such a way that an item of washware which is held by the respective conveyor belt 50, 51 is conveyed through the respective treatment zones of the conveyor dishwasher 1 at a conveying speed which is or can be set individually for the respective conveyor belt 50, 51.

[0068] A further embodiment of the solution according to the invention will be described below with reference to the illustrations in Figures 3a and 3b. Specifically, these figures schematically show the machine outlet-end region of a second exemplary embodiment of a conveyor apparatus 2 which is suitable for use in a conveyor dishwasher 1 according to the illustration in Fig. 1.

[0069] The embodiment of the conveyor apparatus 2 which is illustrated in Figures 3a and 3b differs from the embodiment which is described above with reference to the illustrations in Figures 2a and 2b in that, in addition to the first and second conveyor belts 50, 51, a further conveyor belt 52 is provided. In the embodiment which is illustrated in Figures 3a and 3b, this further conveyor belt 52 runs parallel to the first and second conveyor belts 50, 51 and serves to hold cutlery or cutlery-like washware 103. In this case, provision is preferably made for the further conveyor belt 52 to run directly next to the first conveyor belt 50 and between the first and second conveyor belts 50, 51.

[0070] Like the first conveyor belt 50, the further conveyor belt 52 also has a reduced width in comparison to the total belt surface area, and in particular in comparison to the width of the second conveyor belt 51, in order to ensure minimal utilization of the surface area of the total belt surface area. In other words, despite the provision of the first conveyor belt 50 and of the further conveyor belt 52, the second conveyor belt 51 is suitable, as before, for holding, for example, racks of glasses or two items of washware which are arranged next to one another, for example a plate 101 and a bowl 102.

[0071] It is likewise preferred if, after passing through the conveyor dishwasher 1, the cutlery 103 which is held by the further conveyor belt 52 falls into a container which is provided at the machine outlet, this enabling a further reduction in operating personnel at the machine outlet. In particular, this embodiment enables handling actions for cutlery to be completely dispensed with both at the machine inlet (dirty end of the conveyor dishwasher 1) and at the machine outlet (clean end of the conveyor dishwasher 1).

[0072] The concept of the plurality of conveyor belts which run in parallel can be extended virtually as desired in this sense and various combinations of conveyor belts which are specially provided for specific types of washware are possible. In addition to the above-described solutions in which up to three conveyor belts 50, 51, 52 which run in parallel are provided, it is feasible, in particular, to provide special conveyor lanes for plates 101 and bowls 102 since automatic destacking systems for these types of washware are already known from semi- and fully automatic technology.

[0073] Therefore, with regard to a conveyor dishwasher 1 which operates as efficiently as possible, it is advantageous if, in addition to the first conveyor belt 50 which is specially designed for holding trays or tray-like washware 100, and in addition to the further conveyor belt 52 which is specially designed for holding cutlery 103, further conveyor belts or conveyor belt lanes which are designed in respect of a special type of washware are provided.

[0074] In this connection, reference is made to the embodiment which is illustrated in Figures 4a and 4b. The conveyor apparatus 2 which is partially illustrated in these figures corresponds substantially to the embodiment which is described above with reference to the illustration in Figures 3a and 3b, but with the second conveyor belt 51 now having been subdivided into a conveyor lane for the type of washware "plates" and a further conveyor lane for the type of washware "bowls". In other words, in the embodiment which is illustrated in Figures 4a and 4b, the second conveyor belt 51 is subdivided into two conveyor belts 51a, 51b which run parallel to one another. Although not illustrated in the drawings, each conveyor belt 51a, 51b has an automatic stacking or destacking device at the machine inlet (dirty end of the conveyor dishwasher 1) and/or at the machine outlet (clean end of the conveyor dishwasher 1) in order to stack plates 101 into or to destack plates 101 from the conveyor belt 51a and in order to stack bowls 102 into the conveyor belt 51b or to destack bowls 102 from the conveyor belt 51b.

[0075] This subdivision of the second conveyor belt 51 into special lanes and automated stacking and destack-

ing increase the degree of automation of the conveyor dishwasher 1, and therefore working time can be saved both at the clean end and at the dirty end of the conveyor dishwasher 1. The dishwashing process therefore runs more efficiently and its total length is reduced, and therefore, in addition to working time, resources can also be saved.

[0076] It is feasible for a common drive apparatus to be provided for the second conveyor belt 51 and the at least one further conveyor belt 52, or for the conveyor belt 51 which is subdivided into two conveyor belts 51a, 51b and the at least one further conveyor belt 52, the corresponding conveyor belts 51, 51a, 51b, 52 being jointly driven by means of the common drive apparatus. The conveying speed of each conveyor belt 50, 51, 51a, 51b, 52 can preferably be set individually.

[0077] The illustration in Fig. 4b shows that the respective upper faces of the conveyor belts 50, 51a, 51b and 52 of the conveyor apparatus 2 lie in a common horizontal plane. This allows washware to also be held across a plurality of conveyor belts 50, 51a, 51b and 52, that is to say by a plurality of conveyor belts 50, 51a, 51b and 52 at the same time.

[0078] It should be noted that the invention is not restricted to the exemplary embodiments which are illustrated above with reference to the drawings, but rather can be gathered by examining all the individual features disclosed in these exemplary embodiments together.

Claims

1. Conveyor dishwasher (1), in particular commercial conveyor dishwasher (1), having at least one wash zone (10, 11.1, 11.2, 12) and at least one final rinse zone (13) and also having a conveyor apparatus (2) for conveying washware (100, 101, 102, 103) through the at least one wash zone (10, 11.1, 11.2, 12) and the at least one final rinse zone (13), wherein the conveyor apparatus (2) has a first conveyor belt (50) for trays or tray-like washware (100) and a second conveyor belt (51), which runs parallel to the first conveyor belt (50), for other washware (101, 102, 103), and wherein the first conveyor belt (50) has a width which is reduced in comparison to the second conveyor belt (51) in such a way that a tray or a tray-like item (100) of washware can be held by the first conveyor belt (50) only when it is in a state in which it is placed on edge and is oriented parallel to the conveying direction (T), wherein a guide which is associated with the first conveyor belt (50) is provided for guiding a tray or tray-like item (100) of washware which is held by the first conveyor belt (50) as it is conveyed through the at least one wash zone (10, 11.1, 11.2, 12) and the at least one final rinse zone (13), wherein the first conveyor belt (50) is in the form of an endless drive belt that comprises a guide groove (60) formed in the first conveyor belt (50), wherein the guide groove (60) runs in the longitudinal direction of the first conveyor belt (50) and wherein the guide groove (60) is configured to hold a border or edge region (100') of the tray or tray-like item (100) of washware which is placed on the first conveyor belt (50) as it is conveyed through the respective treatment zones of the conveyor dishwasher (1), wherein the guide comprises a belt guide (62) which is associated with the first conveyor belt (50) and which is provided for guiding the first conveyor belt (50), said belt guide (62) being configured not only for guiding the first conveyor belt (50), but also for guiding the tray or tray-like item (100) of washware, which is placed on the first conveyor belt (50), as it is conveyed through the respective treatment zones of the conveyor dishwasher (1), and wherein a machine outlet is provided downstream of the at least one final rinse zone (13) as seen in the conveying direction (T), wherein the guide rail of the guide associated with the first conveyor belt (50) runs in such a way that a tray or tray-like item (100) of washware, which is held on the first conveyor belt (50), is transferred from its state in which it is placed on edge to its horizontally oriented normal state and then automatically destacked at the machine outlet, wherein the conveying speed at which an item (100) of washware which is held by the first conveyor belt (50) is conveyed through the at least one wash zone (10, 11.1, 11.2, 12) and the at least one final rinse zone (13) is different than the conveying speed at which an item (101, 102, 103) of washware which is held by the second conveyor belt (51) is conveyed through the at least one wash zone (10, 11.1, 11.2, 12) and the at least one final rinse zone (13).

2. Conveyor dishwasher (1) according to claim 1, wherein the upper guide element (61) is adjustable in the vertical direction for the purpose of matching the guide to the height of a tray or tray-like item (100) of washware which is to be held by the first conveyor belt (50) and is placed on edge.

3. Conveyor dishwasher (1) according to claim 1 or 2, wherein the belt guide (62) is fixed to belt rod shafts (55) which are part of the second conveyor belt (51), and wherein the belt guide (62) is preferably designed to support and/or to guide a border or edge region (100') of a tray or tray-like item (100) of washware which is placed on edge.

4. Conveyor dishwasher (1) according to one of claims 1 to 3, wherein at least one further conveyor belt (52) which runs parallel to the first and second conveyor belts (50, 51) also is provided, in particular a further conveyor belt (52) for cutlery (103), this further conveyor belt preferably running directly next to the first conveyor belt (50) and between the first and second con-

veyor belts (50, 51).

5. Conveyor dishwasher (1) according to claim 4, wherein a common drive apparatus is provided for the second and the at least one further conveyor belt (51, 52), the second and the at least one further conveyor belt (51, 52) being jointly driven by means of the said common drive apparatus.

6. Conveyor dishwasher (1) according to one of claims 1 to 5,
wherein a common drive apparatus is provided for the first and second conveyor belts (50, 51), the first and second conveyor belts (50, 51) being jointly driven by means of the said common drive apparatus.

7. Conveyor dishwasher (1) according to claim 6,

wherein the first conveyor belt (50) is connected to the common drive apparatus by means of a first drive shaft which is associated with the first conveyor belt (50) and a first gear mechanism apparatus which is associated with the first conveyor belt (50),
wherein the second conveyor belt (51) is connected to the common drive apparatus by means of a second drive shaft which is associated with the second conveyor belt (51) and a second gear mechanism apparatus which is associated with the second conveyor belt (51), and
wherein the respective transmission ratio of the first and the second gear mechanism apparatus is different in such a way that the conveying speed at which an item (100) of washware which is held by the first conveyor belt (50) is conveyed through the at least one wash zone (10, 11.1, 11.2, 12) and the at least one final rinse zone (13) is higher than the conveying speed at which an item of washware (101, 102, 103) which is held by the second conveyor belt (51) is conveyed through the at least one wash zone (10, 11.1, 11.2, 12) and at least one final rinse zone (13).

8. Conveyor dishwasher (1) according to claim 5 or 6, wherein the respective conveyor belts (50, 51, 52) is connected to the common drive apparatus by means of a common drive shaft.

9. Conveyor dishwasher (1) according to one of claims 1 to 4,
wherein an associated drive apparatus is provided for each conveyor belt (50, 51, 52) for the purpose of driving the corresponding conveyor belt (50, 51, 52) in such a way that an item (100, 101, 102, 103) of washware which is held by the respective conveyor belt (50, 51, 52) is conveyed through the at least one wash zone (10, 11.1, 11.2, 12) and the at least one final rinse zone (13) at a conveying speed which is or can be set individually for the respective conveyor belt (50, 51, 52).

10. Conveyor dishwasher (1) according to one of claims 1 to 9,
wherein the respective upper faces of the conveyor belts (50, 51, 52) of the conveyor apparatus (2) lies in a common horizontal plane in such a way that washware (100, 101, 102, 103) can be held by a plurality of conveyor belts (50, 51, 52) at the same time.

11. Conveyor dishwasher (1) according to one of claims 1 to 10,
wherein the second conveyor belt (51) is subdivided into a plurality of conveyor belts (51a, 51b) which run parallel to one another and can in each case be associated with a specific type of washware.

Patentansprüche

1. Durchlaufspülmaschine (1), insbesondere gewerbliche Durchlaufspülmaschine (1), die mindestens eine Waschzone (10, 11.1, 11.2, 12) und mindestens eine Nachspülzone (13) und darüber hinaus eine Fördervorrichtung (2) zum Fördern von
Spülgut (100, 101, 102, 103) durch die mindestens eine Waschzone (10, 11.1, 11.2, 12) und die mindestens eine Nachspülzone (13) aufweist, wobei die Fördervorrichtung (2) ein erstes Förderband (50) für Tabletts oder Tablettähnliches Spülgut (100) und ein zweites Förderband (51), das parallel zu dem ersten Förderband (50) verläuft, für anderes Spülgut (101, 102, 103) aufweist, und wobei das erste Förderband (50) eine im Vergleich zu dem zweiten Förderband (51) derart verringerte Breite aufweist, dass ein Tablett oder ein Tablett-ähnlicher Spülgutartikel (100) von dem ersten Förderband (50) nur dann gehalten werden kann, wenn er sich in einem Zustand befindet, in dem er hochkant gestellt und parallel zu der Förderrichtung (T) ausgerichtet ist, wobei eine Führung, die mit dem ersten Förderband (50) verbunden ist, zum Führen eines Tabletts oder eines Tablettähnlichen Spülgutartikels (100) vorgesehen ist, der von dem ersten Förderband (50) gehalten wird, während er durch die mindestens eine Waschzone (10, 11.1, 11.2, 12) und die mindestens eine Nachspülzone (13) gefördert wird, wobei das erste Förderband (50) die Form eines Endlos-Antriebsbandes aufweist, das eine Führungsnut (60) aufweist, die in dem ersten Förderband (50) ausgebildet ist, wobei die Führungsnut (60) in der Längsrichtung des ersten Förderbandes (50) verläuft und wobei die Führungsnut (60) so konfiguriert ist, dass sie einen Rand- oder Kantenbereich (100') des Tabletts oder des Tablett-ähnlichen Spülgutartikels (100) hält, der

auf dem ersten Förderband (50) platziert wird, während er durch die jeweiligen Behandlungszonen der Durchlaufspülmaschine (1) gefördert wird, wobei die Führung eine Bandführung (62) aufweist, die mit dem ersten Förderband (50) verbunden ist und die zum Führen des ersten Förderbands (50) vorgesehen ist, wobei die Bandführung (62) nicht nur zum Führen des ersten Förderbandes (50) konfiguriert ist, sondern auch zum Führen des Tabletts oder des Tablett-ähnlichen Spülgutartikels (100), der auf dem ersten Förderband (50) platziert ist, während er durch die jeweiligen Behandlungszonen der Durchlaufspülmaschine (1) gefördert wird, und wobei ein Maschinenauslass in Förderrichtung (T) gesehen der mindestens einen Nachspülzone (13) nachgelagert vorgesehen ist, wobei die Führungsschiene der mit dem ersten Förderband (50) verbundenen Führung derart verläuft, dass ein Tablett oder ein Tablett-ähnlicher Spülgutartikel (100), der auf dem ersten Förderband (50) gehalten wird, von seinem Zustand, in dem er hochkant platziert ist, in seinen horizontal orientierten Normalzustand überführt und dann automatisch an dem Maschinenausgang entstapelt wird, wobei die Fördergeschwindigkeit, mit der ein Spülgutartikel (100), der durch das erste Förderband (50) gehalten wird, durch die mindestens eine Waschzone (10, 11.1, 11.2, 12) und die mindestens eine Nachspülzone (13) gefördert wird, sich von der Fördergeschwindigkeit unterscheidet, mit der ein Spülgutartikel (101, 102, 103), der von dem zweiten Förderband (51) gehalten wird, durch die mindestens eine Waschzone (10, 11.1, 11.2, 12) und die mindestens eine Nachspülzone (13) gefördert wird.

2. Durchlaufspülmaschine (1) nach Anspruch 1, wobei das obere Führungselement (61) in vertikaler Richtung verstellbar ist, um die Führung an die Höhe eines durch das erste Förderband (50) zu haltenden, hochkant platzierten Tabletts oder Tablett-ähnlichen Spülgutartikels (100) anzupassen.

3. Durchlaufspülmaschine (1) nach Anspruch 1 oder 2, wobei die Bandführung (62) an Bandstangenwellen (55) befestigt ist, die Teil des zweiten Förderbandes (51) sind, und wobei die Bandführung (62) bevorzugt so ausgelegt ist, dass sie einen Rand- oder Kantenbereich (100') eines Tabletts oder eines Tablett-ähnlichen Spülgutartikels (100), der hochkant platziert ist, stützt und/oder führt.

4. Durchlaufspülmaschine (1) nach einem der Ansprüche 1 bis 3, wobei darüber hinaus mindestens ein weiteres, parallel zu dem ersten und zweiten Förderband (50, 51) verlaufendes Förderband (52) vorgesehen ist, insbesondere ein weiteres Förderband (52) für Besteck (103), wobei dieses weitere Förderband bevorzugt unmittelbar neben dem ersten Förderband (50) und zwischen dem ersten und zweiten Förderband (50, 51) verläuft.

5. Durchlaufspülmaschine (1) nach Anspruch 4, wobei eine gemeinsame Antriebsvorrichtung für das zweite und das mindestens eine weitere Förderband (51, 52) vorgesehen ist, wobei das zweite und das mindestens eine weitere Förderband (51, 52) gemeinsam mittels der gemeinsamen Antriebsvorrichtung angetrieben werden.

6. Durchlaufspülmaschine (1) nach einem der Ansprüche 1 bis 5, wobei eine gemeinsame Antriebsvorrichtung für das erste und das zweite Förderband (50, 51) vorgesehen ist, wobei das erste und das zweite Förderband (50, 51) gemeinsam mittels der gemeinsamen Antriebsvorrichtung angetrieben werden.

7. Durchlaufspülmaschine (1) nach Anspruch 6,

wobei das erste Förderband (50) mit der gemeinsamen Antriebsvorrichtung mittels einer ersten Antriebswelle, die mit dem ersten Förderband (50) verbunden ist, und einer ersten Getriebevorrichtung, die mit dem ersten Förderband (50) verbunden ist, verbunden ist,
wobei das zweite Förderband (51) mit der gemeinsamen Antriebsvorrichtung mittels einer zweiten Antriebswelle, die mit dem zweiten Förderband (51) verbunden ist, und einer zweiten Getriebevorrichtung, die mit dem zweiten Förderband (51) verbunden ist, verbunden ist, und wobei das jeweilige Übersetzungsverhältnis der ersten und der zweiten Getriebemechanismusvorrichtung derart unterschiedlich ist, dass die Fördergeschwindigkeit, mit der ein Spülgutartikel (100), der durch das erste Förderband (50) gehalten wird, durch die mindestens eine Waschzone (10, 11.1, 11.2, 12) und die mindestens eine Nachspülzone (13) gefördert wird, höher ist als die Fördergeschwindigkeit, mit der ein Spülgutartikel (101, 102, 103), der von dem zweiten Förderband (51) gehalten wird, durch die mindestens eine Waschzone (10, 11.1, 11.2, 12) und mindestens eine Nachspülzone (13) gefördert wird.

8. Durchlaufspülmaschine (1) nach Anspruch 5 oder 6, wobei die jeweiligen Förderbänder (50, 51, 52) mittels einer gemeinsamen Antriebswelle mit der gemeinsamen Antriebsvorrichtung verbunden sind.

9. Durchlaufspülmaschine (1) nach einem der Ansprüche 1 bis 4, wobei für jedes Förderband (50, 51, 52) eine verbundene Antriebsvorrichtung zum Antrieb des entsprechenden Förderbandes (50, 51, 52) vorgesehen ist, sodass ein von dem jeweiligen Förderband (50, 51, 52) gehaltener Spülgutartikel (100,

101, 102, 103) mit einer Fördergeschwindigkeit durch die mindestens eine Waschzone (10, 11.1, 11.2, 12) und die mindestens eine Nachspülzone (13) gefördert werden kann, die für das jeweilige Förderband (50, 51, 52) individuell eingestellt ist oder eingestellt werden kann.

10. Durchlaufspülmaschine (1) nach einem der Ansprüche 1 bis 9, wobei die jeweiligen oberen Flächen der Förderbänder (50, 51, 52) der Fördervorrichtung (2) in einer gemeinsamen horizontalen Ebene liegen, sodass Spülgut (100, 101, 102, 103) gleichzeitig von einer Mehrzahl von Förderbändern (50, 51, 52) gehalten werden kann.

11. Durchlaufspülmaschine (1) nach einem der Ansprüche 1 bis 10, wobei das zweite Förderband (51) in eine Mehrzahl von Förderbändern (51a, 51b) unterteilt ist, die parallel zueinander verlaufen und jeweils einem bestimmten Typ von Spülgut zugeordnet sein können.

Revendications

1. Lave-vaisselle à convoyeur (1), en particulier lave-vaisselle à convoyeur commercial (1), ayant au moins une zone de lavage (10, 11.1, 11.2, 12) et au moins une zone de rinçage final (13) et ayant également un appareil de transport (2) pour le transport d'articles de vaisselle (100, 101, 102, 103) à travers l'au moins une zone de lavage (10, 11.1, 11.2, 12) et l'au moins une zone de rinçage final (13), dans lequel l'appareil de transport (2) a une première bande de transport (50) pour des plateaux ou des articles de vaisselle en forme de plateau (100) et une deuxième bande de transport (51), qui fonctionne parallèlement à la première bande de transport (50), pour d'autres articles de vaisselle (101, 102, 103), et dans lequel la première bande de transport (50) a une largeur qui est réduite par rapport à la deuxième bande de transport (51) de telle sorte qu'un plateau ou un article en forme de plateau (100) des articles de vaisselle peut être maintenu par la première bande de transport (50) uniquement lorsqu'il est dans un état dans lequel il est placé sur le bord et est orienté parallèlement à la direction de transport (T), dans lequel un guide qui est associé à la première bande de transport (50) est prévu pour guider un plateau ou un article en forme de plateau (100) des articles de vaisselle qui est maintenu par la première bande de transport (50) lorsqu'il est transporté à travers l'au moins une zone de lavage (10, 11.1, 11.2, 12) et l'au moins une zone de rinçage final (13), dans lequel la première bande de transport (50) se présente sous la forme d'une bande d'entraînement sans fin qui comprend une rainure de guidage (60) formée dans la première bande de transport (50), dans lequel la rainure de guidage (60) fonctionne dans la direction longitudinale de la première bande de transport (50) et dans lequel la rainure de guidage (60) est configurée pour maintenir une région de bordure ou de bord (100') du plateau ou de l'article en forme de plateau (100) des articles de vaisselle qui est placé sur la première bande de transport (50) lorsqu'il est transporté à travers les zones de traitement respectives du lave-vaisselle à convoyeur (1), dans lequel le guide comprend un guide de bande (62) qui est associé à la première bande de transport (50) et qui est prévu pour le guidage de la première bande de transport (50), ledit guide de bande (62) étant configuré non seulement pour le guidage de la première bande de transport (50), mais également pour le guidage du plateau ou de l'article en forme de plateau (100) des articles de vaisselle, qui est placé sur la première bande de transport (50), lorsqu'il est transporté à travers les zones de traitement respectives du lave-vaisselle à convoyeur (1), et dans lequel une sortie de machine est prévue en aval de l'au moins une zone de rinçage final (13) telle que vue dans la direction de transport (T), dans lequel le rail de guidage du guide associé à la première bande de transport (50) fonctionne de telle manière qu'un plateau ou un article en forme de plateau (100) des articles de vaisselle, qui est maintenu sur la première bande de transport (50), est transféré de son état dans lequel il est placé sur un bord à son état normal orienté horizontalement, et ensuite désempilé automatiquement à la sortie de la machine, dans lequel la vitesse de transport à laquelle un article (100) des articles de vaisselle qui est maintenu par la première bande de transport (50) est transporté à travers l'au moins une zone de lavage (10, 11.1, 11.2, 12) et l'au moins une zone de rinçage final (13) est différente de la vitesse de transport à laquelle un article (101, 102, 103) des articles de vaisselle qui est maintenu par la second bande de transport (51) est transporté à travers l'au moins une zone de lavage (10, 11.1, 11.2, 12) et l'au moins une zone de rinçage final (13).

2. Lave-vaisselle à convoyeur (1) selon la revendication 1, dans lequel l'élément de guidage supérieur (61) est réglable dans la direction verticale dans le but de la correspondance du guide à la hauteur d'un plateau ou d'un article en forme de plateau (100) des articles de vaisselle qui doit être maintenu par la première bande de transport (50) et est placé sur le bord.

3. Lave-vaisselle à convoyeur (1) selon la revendication 1 ou 2,
dans lequel le guide de bande (62) est fixé à des arbres de tige de bande (55) qui font partie de la second bande de transport (51), et dans lequel le guide de bande (62) est de préférence conçu pour supporter et/ou guider une région de bordure ou de bord (100') d'un plateau ou d'un article en forme de

plateau (100) des articles de vaisselle qui est placé sur le bord.

4. Lave-vaisselle à convoyeur (1) selon l'une des revendications 1 à 3,
dans lequel au moins une bande de transport supplémentaire (52) qui fonctionne parallèlement aux première et deuxième bandes de transport (50, 51) est également prévue, en particulier une bande de transport supplémentaire (52) pour des couverts (103), cette bande de transport supplémentaire fonctionnant de préférence directement à côté de la première bande de transport (50) et entre les première et deuxième bandes de transport (50, 51).

5. Lave-vaisselle à convoyeur (1) selon la revendication 4, dans lequel un appareil d'entraînement commun est prévu pour la deuxième et l'au moins une bande de transport supplémentaire (51, 52), la deuxième et l'au moins une bande de transport supplémentaire (51, 52) étant conjointement entraînées au moyen dudit appareil d'entraînement commun.

6. Lave-vaisselle à convoyeur (1) selon l'une quelconque des revendications 1 à 5,
dans lequel un dispositif d'entraînement commun est prévu pour les première et deuxième bandes de convoyeur (50, 51), les première et deuxième bandes de transport (50, 51) étant entraînées conjointement au moyen dudit dispositif d'entraînement commun.

7. Lave-vaisselle à convoyeur (1) selon la revendication 6,

dans lequel la première bande de transport (50) est reliée à l'appareil d'entraînement commun au moyen d'un premier arbre d'entraînement qui est associé à la première bande de transport (50) et d'un premier appareil à mécanisme d'engrenage qui est associé à la première bande de transport (50),
dans lequel la deuxième bande de transport (51) est reliée à l'appareil d'entraînement commun au moyen d'un second arbre d'entraînement qui est associé à la deuxième bande de transport (51) et d'un second appareil à mécanisme d'engrenage qui est associé à la deuxième bande de transport (51), et
dans lequel le rapport de transmission respectif du premier et du second dispositif de mécanisme d'engrenage est différent de telle sorte que la vitesse de transport à laquelle un article (100) des articles de vaisselle qui est maintenu par la première bande de transport (50) est transportée à travers l'au moins une zone de lavage (10, 11.1, 11.2, 12) et l'au moins une zone de rinçage final (13) est plus élevée que la vitesse de transport à laquelle un article des articles de vaisselle (101, 102, 103) qui est maintenu par la deuxième bande de transport (51) est transporté à travers l'au moins une zone de lavage (10, 11.1, 11.2, 12) et au moins une zone de rinçage final (13).

8. Lave-vaisselle à convoyeur (1) selon la revendication 5 ou 6,
dans lequel les bandes de transport respectives (50, 51, 52) sont reliées à l'appareil d'entraînement commun au moyen d'un arbre d'entraînement commun.

9. Lave-vaisselle à convoyeur (1) selon l'une des revendications 1 à 4,
dans lequel un appareil d'entraînement associé est prévu pour chaque bande de transport (50, 51, 52) dans le but d'entraîner la bande de transport correspondante (50, 51, 52) de telle sorte qu'un article (100, 101, 102, 103) des articles de vaisselle qui est maintenu par la bande de transport respective (50, 51, 52) est transporté à travers l'au moins une zone de lavage (10, 11.1, 11.2, 12) et l'au moins une zone de rinçage final (13) à une vitesse de transport qui est ou peut être définie individuellement pour la bande de transport respective (50, 51, 52).

10. Lave-vaisselle à convoyeur (1) selon l'une des revendications 1 à 9,
dans lequel les faces supérieures respectives des bandes de transport (50, 51, 52) de l'appareil de transport (2) se trouvent dans un plan horizontal commun de telle sorte que les articles de vaisselle (100, 101, 102, 103) peuvent être maintenus par une pluralité de bandes de transport (50, 51, 52) en même temps.

11. Lave-vaisselle à convoyeur (1) selon l'une des revendications 1 à 10,
dans lequel la deuxième bande de transport (51) est subdivisée en une pluralité de bandes de transport (51a, 51b) qui fonctionnent parallèlement les unes aux autres et peuvent dans chaque cas être associées à un type spécifique d'articles de vaisselle.

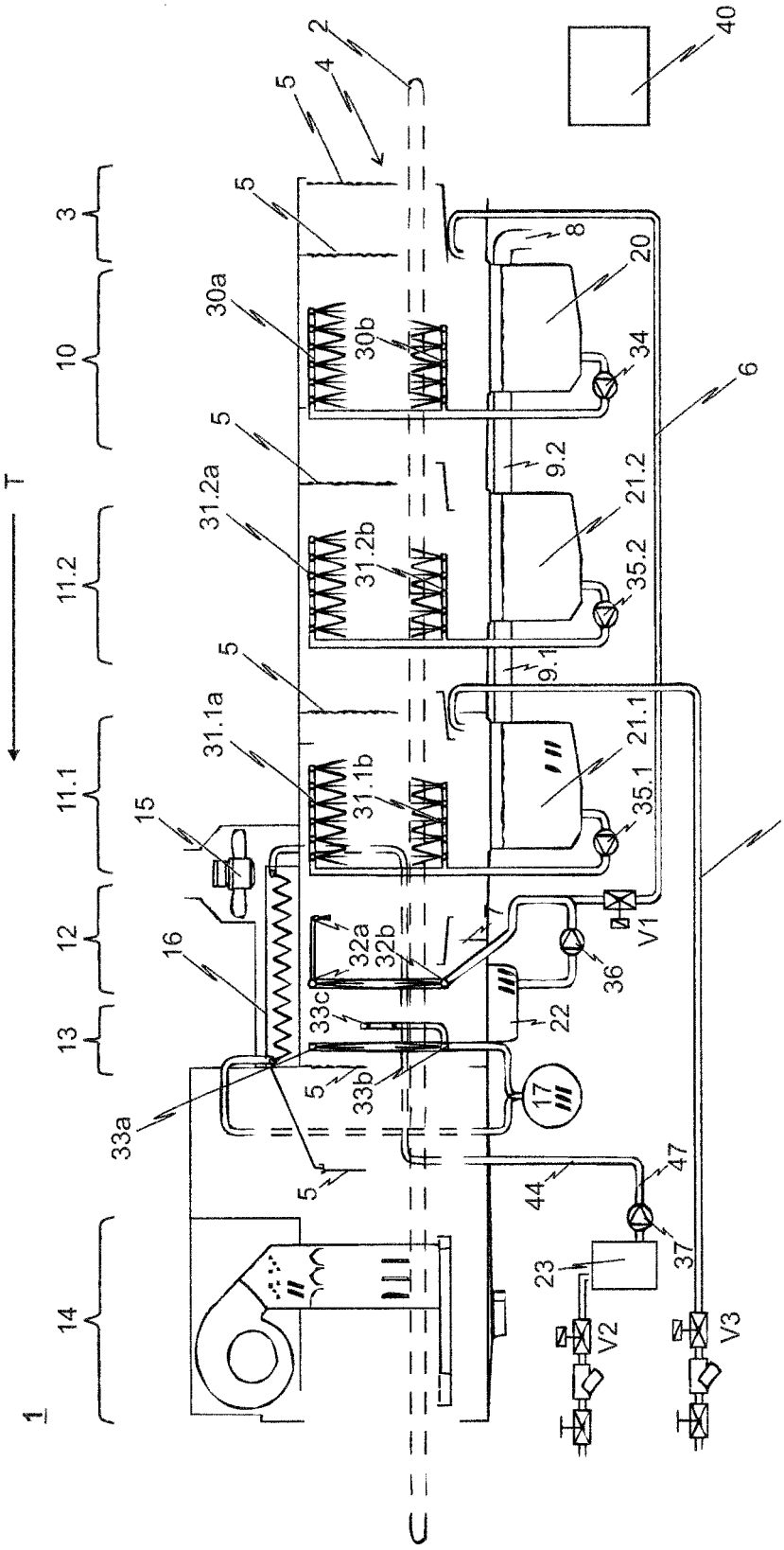
T
1
2
3
4
5
6
8
9.1
9.2
10
11.1
11.2
12
13
14
15
16
17
18
20
21.1
21.2
22
23
30a
30b
31.1a
31.1b
31.2a
31.2b
32a
32b
33a
33b
33c
34
35.1
35.2
36
37
40
44
47
V1
V2
V3

Fig. 1

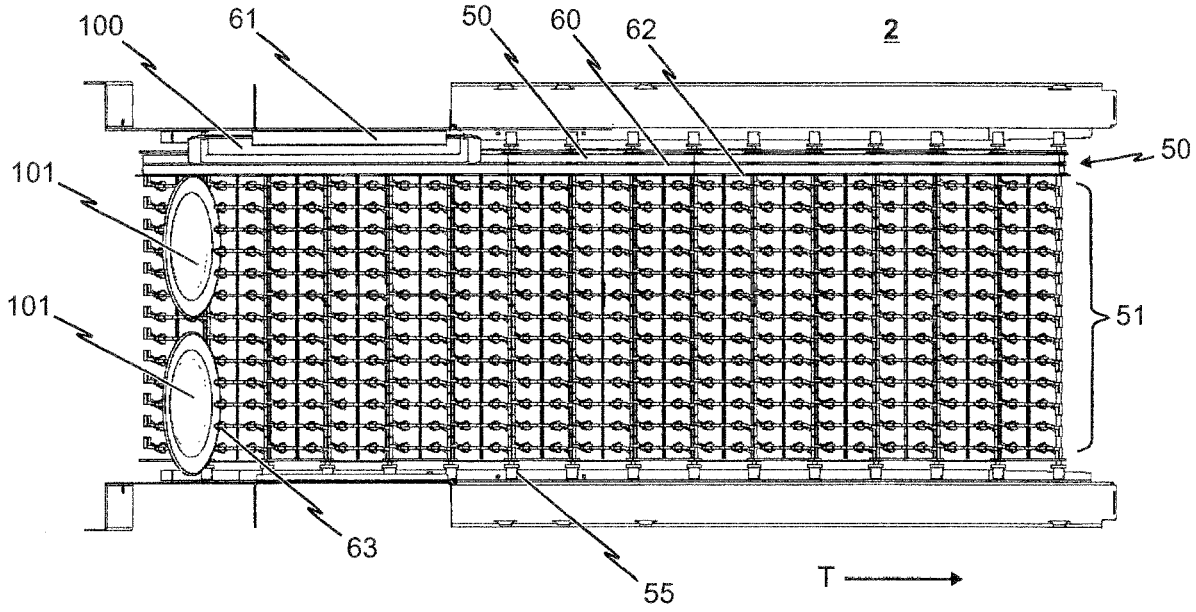
100
61
50
60
62
2
50
101
101
51
63
55
T

Fig. 2a

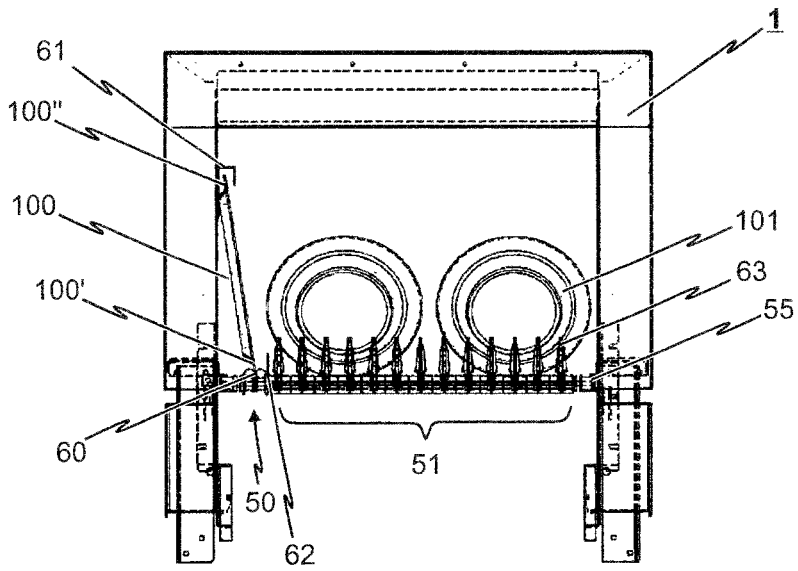
1
61
100"
100
100'
101
63
55
60
51
50
62

Fig. 2b

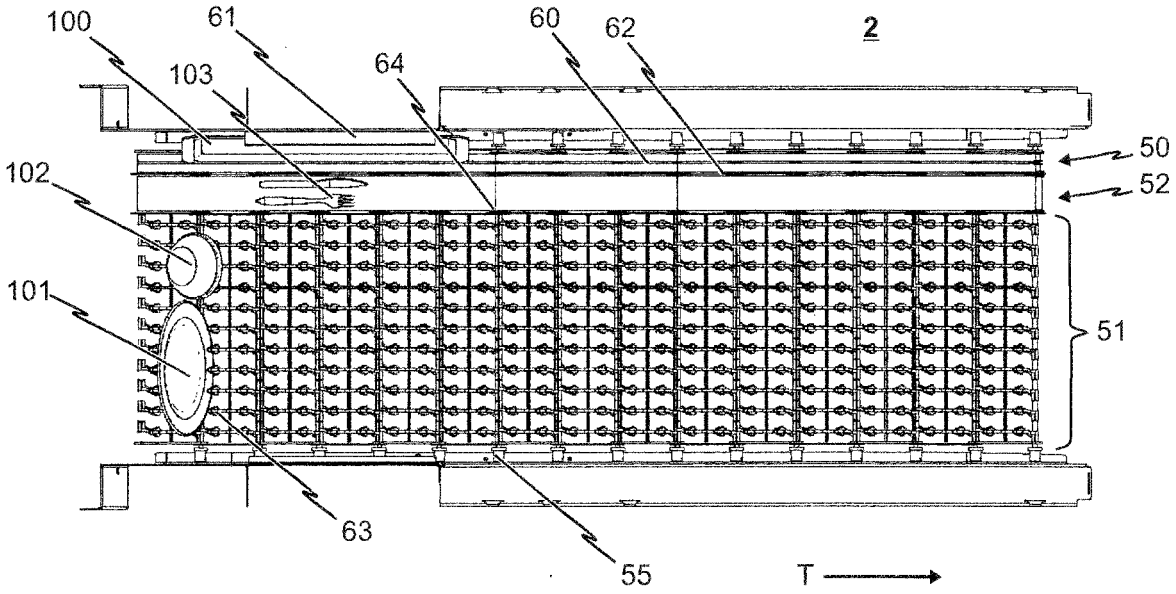
100
61
60
62
2
103
64
50
52
102
101
51
63
55
T

Fig. 3a

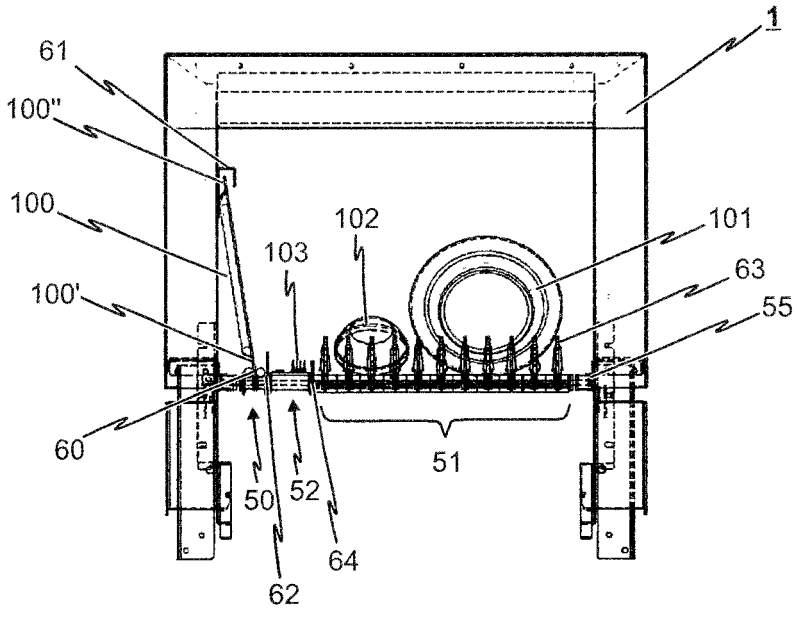
1
61
100"
100
102
101
103
63
100'
55
60
51
50
52
64
62

Fig. 3b

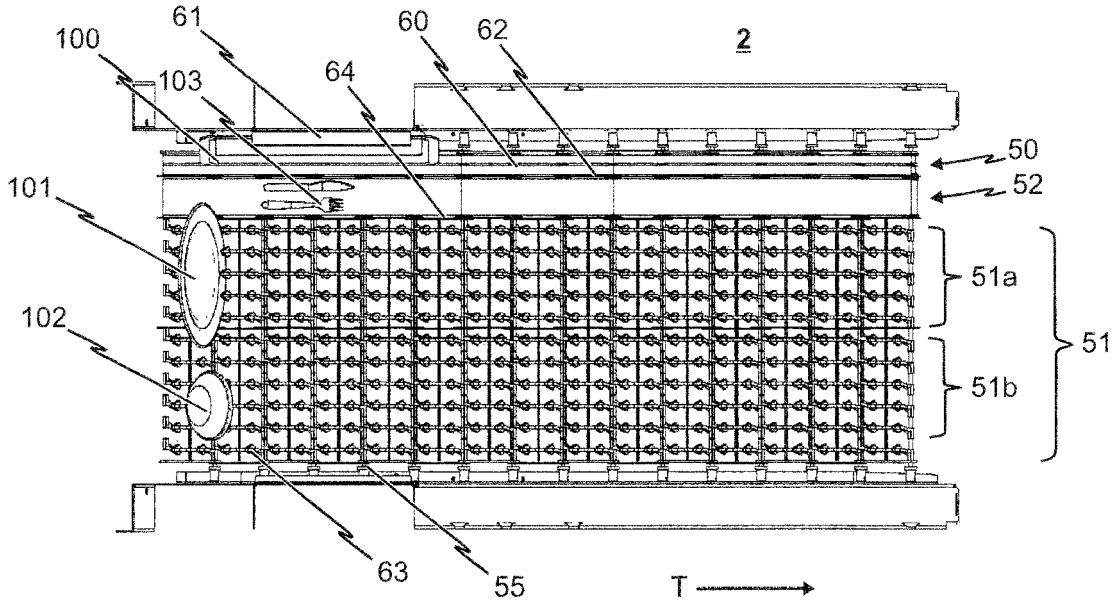
61
60
62
2
100
103
64
50
52
101
51a
102
51
51b
63
55
T

Fig. 4a

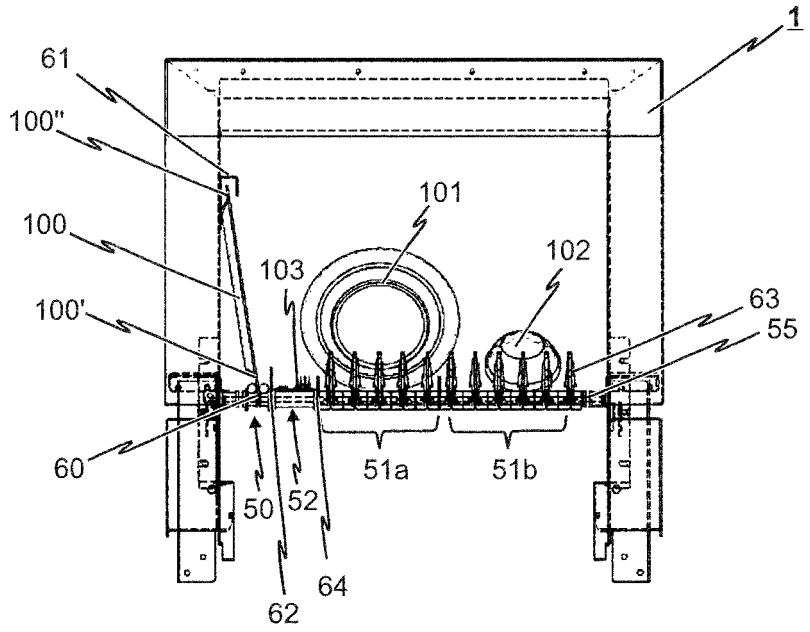
1
61
100"
101
100
103
102
63
55
100'
60
51a
51b
50
52
64
62

Fig. 4b

REFERENCES CITED IN THE DESCRIPTION

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