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(54) Benævnelse: **FREMGANGSMÅDE OG ANORDNING TIL SORTERING AF VASKETØJSSTYKKER**

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Method and device for sorting laundry items

Description

The invention relates to a method and an apparatus for sorting laundry items, in particular dirty laundry items, according to the preambles of Claims 1 and 10.

In industrial laundries, laundry items, in particular dirty laundry items, are delivered by the individual customers in for example bags or laundry trolleys. A large number of laundry items of different types and qualities accumulates in the process. These different-quality laundry items can be of different types of fabric, sizes and colours. The different qualities of the laundry items mean that the latter have to be treated differently. This means that it is necessary, prior to the actual laundry process, for these laundry items to be sorted according to the same or similar qualities. For this purpose, the laundry items are recorded, recorded in respect of their type and/or quality and also, in dependence on the aforementioned criteria, sorted according to the corresponding treatment steps and possible special treatments.

In the case of known sorting devices, the laundry items first of all are fed to sorting stations individually, or in a plurality of piles, on a conveyor. At the sorting stations, personnel either distribute the individual laundry items directly to corresponding discharging locations or transfer them onto a rail system. The individual laundry items each have a sorting criterion, which can be transmitted in particular to a transporting means on the rail system. The individual laundry items are then fed on the rail system, in a hanging state, to further discharging locations or directed into a storage means having a plurality of storage sections.

The laundry items having the same qualities and/or the same sorting criteria here are deposited in discharging locations, in particular in containers, which are assigned corresponding sorting criteria. In the case of large bundles of laundry items, however, it may be the case that laundry items having a specific sorting criterion occur more frequently than laundry items having some other sorting

criterion. As a result, the discharging locations of the sorting device are filled with laundry items in a very non-uniform manner. Whereas discharging locations which are assigned to a sorting criterion for which there is a very large number of laundry items present have to be constantly emptied, other discharging locations of which the sorting criteria occur only very occasionally for the laundry items to be sorted remain pretty much unfilled for a long period of time. This results in very inefficient sorting and thus reduces the sorting performance of the sorting device.

Document US 5 377 814 A discloses an apparatus and a method for sorting laundry items, the apparatus being provided with a conveyor, a storage means with at least one storage section, and discharging locations for laundry items with corresponding sorting criteria, wherein the conveyor transports the laundry items through the storage means and past the discharging locations, and wherein at least a number of discharging locations can be provided with varying sorting criteria.

Taking this as a departure point, the invention is based on the object of creating a method and an apparatus which are intended for sorting laundry items and have an enhanced sorting performance.

A method for achieving this object involves the measures of Claim 1. Accordingly, provision is made for at least a number of discharging locations to be provided with varying sorting criteria. As soon as a discharging location has been filled with laundry items, the latter can be discharged to a further conveyor for further treatment. The then empty discharging location can be provided anew with the same sorting criterion or a sorting criterion which differs from the previous one. The decision as to which sorting criterion the discharging location should be provided with can be made in dependence on which sorting criteria are exhibited by the laundry items which are to be sorted next. This allows the sorting capacity of the sorting device to be utilized particularly efficiently.

In particular, the present invention can also make provision so that, when a batch with laundry items of the same sorting criterion has been put together at a discharging location, the discharging location is, if necessary, assigned a different

sorting criterion. It is thus for example conceivable for the laundry items of the same sorting criterion to be stored on an interim basis in the storage means or in a storage section until a specific number of laundry items has been reached. Thereafter, a discharging location which has been emptied beforehand is assigned the corresponding sorting criterion, whereupon the laundry items are transported to this discharging location via the rail system. This is particularly advantageous for laundry items with sorting criteria which occur infrequently.

Provision can preferably also be made for the sorting criteria assigned to the discharging location to be varied as required. Depending on the number of laundry items with a specific sorting criterion in the storage means, it can be advantageous if the sorting criteria are varied in accordance with the discharging locations. For example, if it turns out that all the laundry items have the same sorting criterion, then it is possible for all the discharging locations likewise to be provided with the same sorting criterion, so that all the laundry items are transferred to the discharging locations as quickly and efficiently as possible.

A further exemplary embodiment of the present invention can make provision for at least one discharging location to be assigned a specific sorting criterion only temporarily. While it is possible for a number of discharging locations always to be provided with the same sorting criterion, it is conceivable to provide a particular discharging location for laundry items of which the sorting criteria occur less frequently than others. As soon as the discharging location for these sorting criteria has been filled, it is emptied, so as to receive laundry items with a different sorting criterion occurring similarly infrequently.

Provision can also be made for the laundry items to be specifically stored on an interim basis on storage sections of the storage means in accordance with their sorting criteria. On account of this interim storage of individual laundry items, these laundry items are combined in groups which have the same sorting criteria. It is thus possible for the sorting device to have for example a multiplicity of storage sections each provided with a sorting criterion. It is also conceivable, however, for the storage means to have just a single storage section, in which the

groups of laundry items with the same sorting criterion are put together in particular one behind the other. As soon as a critical number of laundry items with the same sorting criterion has been reached, these laundry items are collectively fed to the corresponding discharging location via the rail system.

Provision can preferably also be made for laundry items to be moved by the conveyor, from the storage means, past the successive discharging locations and for laundry items of which the sorting criteria correspond to the sorting criteria currently assigned to the discharging locations to be fed to the respective discharging location or locations. The transporting means of the laundry items, in which the sorting criteria of the laundry item are stored, communicate here with the discharging locations, so that the position of the laundry item relative to the discharging locations is always known and therefore the laundry item can be assigned in a specific manner. It is possible here for the laundry items to be fed to the discharging locations directly from the sorting-supply point or from the storage means.

According to the invention, laundry items with sorting criteria which do not correspond to any sorting criteria currently assigned to the discharging locations are transported back into the storage means, wherein the laundry items are transported back into a different storage section of the storage means. The laundry items are transported back in this way until such time as a discharging location corresponds to the sorting criterion of the laundry item. Furthermore, it is conceivable for a laundry item which cannot be provided with any sorting criterion, or of which the sorting criterion occurs too infrequently, to be removed individually from the sorting device.

A further exemplary embodiment of the invention can make provision for a discharging location to be provided with a sorting criterion for the first time when a certain number of laundry items with the same sorting criteria has been stored on an interim basis in a storage section.

An apparatus for achieving the object mentioned in the introduction has the features of Claim 10. Accordingly, provision is made so that at least a number of discharging locations can be provided with varying sorting criteria. The sorting criteria can be provided manually or automatically, to be precise in dependence on the number of laundry items with the same sorting criteria located in the storage section. In particular, the apparatus can be assigned a control device to which the position and the sorting criteria of all the laundry items located in the storage means are known. Furthermore, the control system can provide the discharging locations with different sorting criteria. If the sorting criteria of the laundry items are known, these laundry items are then fed to the corresponding discharging locations, or are fed only when a sufficient number of laundry items with the same sorting criterion has been combined in the storage means.

In particular, the invention can make provision so that the laundry items can be guided by the conveyor from a supply location to the storage means and from the storage means to the discharging locations.

Provision can preferably be made so that, if a laundry item cannot be fed to any of the discharging locations, it can be fed anew to the storage means by a circulating conveyor. Provision can also be made so that the sorting criteria can be temporarily assigned to the discharging locations.

According to the invention, the sorting criteria assigned to the discharging locations can be changed in dependence on which laundry items are to be fed next to the discharging locations.

Furthermore, provision can also be made so that a plurality of discharging locations can be assigned different sorting criteria, preferably a number of discharging locations can be assigned the same sorting criterion.

A preferred exemplary embodiment of the invention will be explained in more detail hereinbelow with reference to the drawing. The single figure of the drawing shows a schematic view of the apparatus.

The exemplary embodiment of an apparatus 10 for sorting laundry items, in particular dirty laundry items, illustrated in the figure constitutes a possible exemplary embodiment of the present invention. The apparatus 10 illustrated here is constructed from a plurality of devices for transporting or conveying purposes, supplying laundry items, sorting and also delivering laundry items. It should be expressly pointed out here that the present invention is not restricted to this combination of individual devices; rather, it should also extend to any other possible combination of the devices illustrated and also further devices.

The exemplary embodiment of the apparatus 10 illustrated in the figure first of all has a supply location 11, to which bundles of laundry, comprising a multiplicity of individual laundry items, can be supplied. The supply location 11 is followed by a conveyor 12, which can be for example an endless belt conveyor or the like. The conveyor 12 is followed by a further conveyor 13, which leads along a sorting device 14. In the case of the exemplary embodiment illustrated here, this sorting device is assigned five discharging locations 15. The discharging locations 15 are arranged along the conveyor 13. Furthermore, the sorting device 14 is assigned a rail system 16, on which a multiplicity of transporting hangers 17 are mounted in a movable manner. The rail system 16 has carry-along members, which can guide the transporting hangers 17 along the rail system 16. At the sorting device 14, individual laundry items are transferred to the transporting hangers 17 by a member of personnel 18. The transporting hangers 17 illustrated here each have a data-storage means, in which the sorting criteria of each individual laundry item, for example the type, size and/or colour of the laundry item, are stored.

The rail system 16 has a first circulating conveyor 19. The transporting hangers 17 or the laundry items are fed first of all to the first circulating conveyor 19 by the member of personnel 18. As operation continues, the rail system of the first circulating conveyor 19 leads past further discharging locations 20. As operation continues, the first circulating conveyor 19 leads back to the sorting device 14, so that a closed circuit forms.

In the case of the exemplary embodiment illustrated here, the discharging locations 15 and 20 are assigned a joint conveyor 21, which can be for example an endless belt conveyor. The discharging locations 15, 20 are designed such that they can empty their contents on the conveyor 21.

The portion of the first circulating conveyor 19 along the discharging locations 20 constitutes a storage means 22, in which laundry items can be stored for at least a brief time. The first circulating conveyor 19 is adjoined by a second circulating conveyor 23, which in this case is designed in the form of a storage means 24. The storage means 24 illustrated here has a multiplicity of parallel storage sections 25. Transporting hangers 17 or laundry items can be redirected from the first circulating conveyor 19, via a transition portion 29 or a diverter, onto the second circulating conveyor 23. On the second circulating conveyor 23 or the storage means 24, the transporting hangers 17 can be stored on an interim basis in different storage sections 25.

The individual transporting hangers 17 or laundry items can be guided back from the second circulating conveyor 23, via a further transition portion 29 (not illustrated) or a further diverter, onto the first circulating conveyor 19. Exactly like the first circulating conveyor 19, the second circulating conveyor 23 also has a portion which runs via the discharging locations 20.

The conveyors 13 and 21 lead to a further treatment device 26, where the laundry items can be combined into batches in laundry bags 27. In the case of the exemplary embodiment illustrated here, it is also the case that the treatment device 26 is assigned a further sorting device 28.

The method according to the invention will be explained hereinbelow with reference to the apparatus 10 described above. The laundry items which are to be treated, or the dirty laundry items, first of all are fed to the supply location 11, from where they are fed in the treatment direction 28 from the conveyor 12 to the conveyor 13. There, they are assigned to the sorting device 14 in the treatment direction 28. At the sorting device, one or more members of personnel 18 either

feed the individual laundry items manually to the discharging locations 15 or transfer them to transporting hangers 17, which are assigned on the rail system 16 and/or to the first circulating conveyor 19. The discharging locations 15 can have different sorting criteria. Laundry items which correspond to the sorting criteria of the discharging locations 15 are therefore sorted to these discharging locations 15. As soon as a discharging location 15 has reached its storage capacity, its contents are emptied onto the conveyor 21. The group of laundry items of the same sorting criterion thus emptied on the conveyor 21 is then fed to the treatment device 26, where the laundry items are delivered for example into laundry bags 27.

The laundry items which have not been transferred to the discharging location 15 by the member of personnel 18 are transported away on the rail system 16, hanging on the transporting hangers 17 in the process, counter to the treatment direction 28. The sorting criteria of the individual laundry items are stored here in the transporting hangers 17. Thereafter, the laundry items hanging on the transporting hangers 17 are guided along further discharging locations 20. These discharging locations 20 also each have a sorting criterion. Laundry items of which the sorting criterion corresponds to those of a discharging location 20 are automatically deposited in this discharging location. For this purpose, a control device (not illustrated) records the sorting criterion of the laundry item and controls the transporting hanger 17 such that the latter allows the laundry item to drop above the corresponding discharging location 20.

Laundry items with sorting criteria which do not correspond to any of the sorting criteria of the discharging locations 20 are fed to the second circulating conveyor 23 via rails. Here, the laundry items can be stored on an interim basis on different storage sections 25, which can likewise be provided with different sorting criteria. From these storage sections 25, the laundry items can be guided anew past the discharging locations 20. Provision is made according to the invention so that the discharging locations can be provided with varying sorting criteria. If for example a discharging location 20 has reached its maximum storage capacity, then these laundry items are transferred as a group with identical sorting criteria to the conveyor 21. Thereafter, this discharging location 20 can be provided with a

different sorting criterion or else also the same sorting criterion. Laundry items which do not correspond to any of the sorting criteria of the discharging location 20 are first of all combined into a group with the same sorting criteria in the storage sections 25 until such time as a specific number of laundry items has been combined. This group of laundry items of the same sorting criterion is then fed to a discharging location 20 which is correspondingly provided with a sorting criterion. If laundry items from the storage means 24 or from the storage sections 25 are guided anew past the discharging locations 20 and if, once again, these have no corresponding sorting criterion, the laundry items are guided back again in the storage means 24 or onto the storage sections 25.

Laundry items with sorting criteria by which only a small number of laundry items could be pre-sorted can also be guided back to the sorting device 14, where they are separated out manually by the member of personnel 18. If a bundle of laundry comprises exclusively laundry items with a single sorting criterion, it is also possible for a plurality of, or all, the discharging locations 20 to be provided with the same sorting criterion, so that the multiplicity of laundry items can thus be removed efficiently and quickly.

List of reference signs:

10	apparatus
11	supply location
12	conveyor
13	conveyor
14	sorting device
15	discharging locations
16	rail system
17	transporting hanger
18	member of personnel
19	first circulating conveyor
20	discharging location
21	conveyor
22	storage means
23	second circulating conveyor
24	storage means
25	storage section
26	treatment device
27	laundry bag
28	treatment direction
29	transition portion

Patentkrav

1. Fremgangsmåde til sortering af vasketøjsstykker, særligt beskidte vasketøjsstykker, hvor individuelle vasketøjsstykker transporteres af en transportør (12, 13, 19, 23) efter hinanden til en opbevaringsenhed (22, 24), vasketøjsstykkerne transporteres fra opbevaringsenheden (22, 24) til afgivelsessteder (15, 20) og overføres til et afgivelsessted (15, 20), der svarer til det respektive sorteringskriterium herfor, hvor

mindst nogle afgivelsessteder (15, 20) tildeles skiftende sorteringskriterier, og hvor mindst et afgivelsessted (15, 20) kun midlertidigt tildeles et bestemt sorteringskriterium, kendetegnet ved, at
sorteringskriterierne, der er tilknyttet afgivelsesstederne (15, 20), ændres afhængigt af hvilke vasketøjsstykker, der som det næste tilføres afgivelsesstederne (15, 20), og hvor
vasketøjsstykker med sorteringskriterier, som ikke svarer til nogen af de sorteringskriterier, der for øjeblikket er tilknyttet afgivelsesstederne (15, 20), transporteres tilbage til opbevaringsenheden (22, 24), og hvor
i mindst en opbevaringslinje (25) af opbevaringsenheden (24) vasketøjsstykker samles, som har et andet sorteringskriterium end de sorteringskriterier, der for øjeblikket er tilknyttet afgivelsesstederne (15, 20).

2. Fremgangsmåde ifølge krav 1, kendetegnet ved, at når der på et afgivelsessted (15, 20) er sammensat et parti med vasketøjsstykker med samme sorteringskriterium, tilknyttes afgivelsesstedet (15, 20) om nødvendigt et andet sorteringskriterium.

3. Fremgangsmåde ifølge krav 1 eller 2, kendetegnet ved, at
sorteringskriteriet tilknyttet afgivelsesstedet (15, 20) skiftes efter behov.

4. Fremgangsmåde ifølge et af de foregående krav, kendetegnet ved, at vasketøjsstykkerne i henhold til deres sorteringskriterier mellemlagres målrettet på opbevaringslinjer (25) af opbevaringsenheden ((24), og/eller vasketøjsstykker med samme sorteringskriterier føres ind i den tilsvarende opbevaringslinje (25) af opbevaringsenheden (24).

5. Fremgangsmåde ifølge et af de foregående krav, kendetegnet ved, at vasketøjsstykkerne af transportøren (19, 23) køres ud af opbevaringsenheden (22, 24) forbi de efter hinanden følgende afgivelsessteder (15, 20), og vasketøjsstykker, hvis sorteringskriterier svarer til de sorteringskriterier, der for øjeblikket er tilknyttet afgivelsesstederne (15, 20), tilføres det eller de respektive afgivelsessteder (15, 20).

6. Fremgangsmåde ifølge et af de foregående krav, kendetegnet ved, at vasketøjsstykker med sorteringskriterier, som ikke svarer til nogen af de sorteringskriterier, der for øjeblikket er tilknyttet afgivelsesstederne (15, 20), transporteres tilbage til opbevaringsenheden (22, 24), hvor vasketøjsstykkerne transporteres tilbage til en anden opbevaringslinje (25) af opbevaringsenheden (24).

7. Fremgangsmåde ifølge et af de foregående krav, kendetegnet ved, at et afgivelsessted (15, 20) først tildeles et sorteringskriterium, når et vist antal vasketøjsstykker med samme sorteringskriterium er mellemlagret i en opbevaringslinje (25).

8. Anordning (10) til sortering af vasketøjsstykker, særligt beskidte vasketøjsstykker, med en transportør (12, 13, 19, 23), med en opbevaringsenhed (22, 24) med mindst en opbevaringslinje (25) og med afgivelsessteder (15, 20) til vasketøjsstykker med tilsvarende sorteringskriterier, hvor transportøren (19, 23) transporterer vasketøjsstykkerne gennem opbevaringsenheden (22, 24) og forbi afgivelsesstederne (15, 20), hvor mindst nogle afgivelsessteder (15, 20) kan tildeles skiftende sorteringskriterier, kendetegnet ved, at vasketøjsstykkerne af transportøren (19 23) kan føres eller transporteres fra et indleveringssted til opbevaringsenheden (22, 24) og ud af opbevaringsenheden (22, 24) til afgivelsesstederne (15, 20), og sorteringskriterierne tilknyttet afgivelsesstederne (15, 20) kan ændres afhængigt af, hvilke vasketøjsstykker der som det næste skal tilføres afgivelsesstederne (15, 20).

9. Anordning (10) ifølge krav 8, kendetegnet ved, at hvis et vasketøjsstykke ikke kan tilføres nogen af afgivelsesstederne (15, 20), kan det ved hjælp af en cirkulerende transportør (19, 23) på ny tilføres opbevaringsenheden (22, 24).

10. Anordning (10) ifølge et af kravene 8 eller 9, kendetegnet ved, at sorteringskriterierne kan tilknyttes afgivelsesstederne (15, 20) midlertidigt.

11. Anordning (10) ifølge et af kravene 8 til 10, kendetegnet ved, at flere afgivelsessteder (15, 20) kan tilknyttes forskellige sorteringskriterier, foretrukket nogle afgivelsessteder (15, 20) kan tilknyttes samme sorteringskriterium.

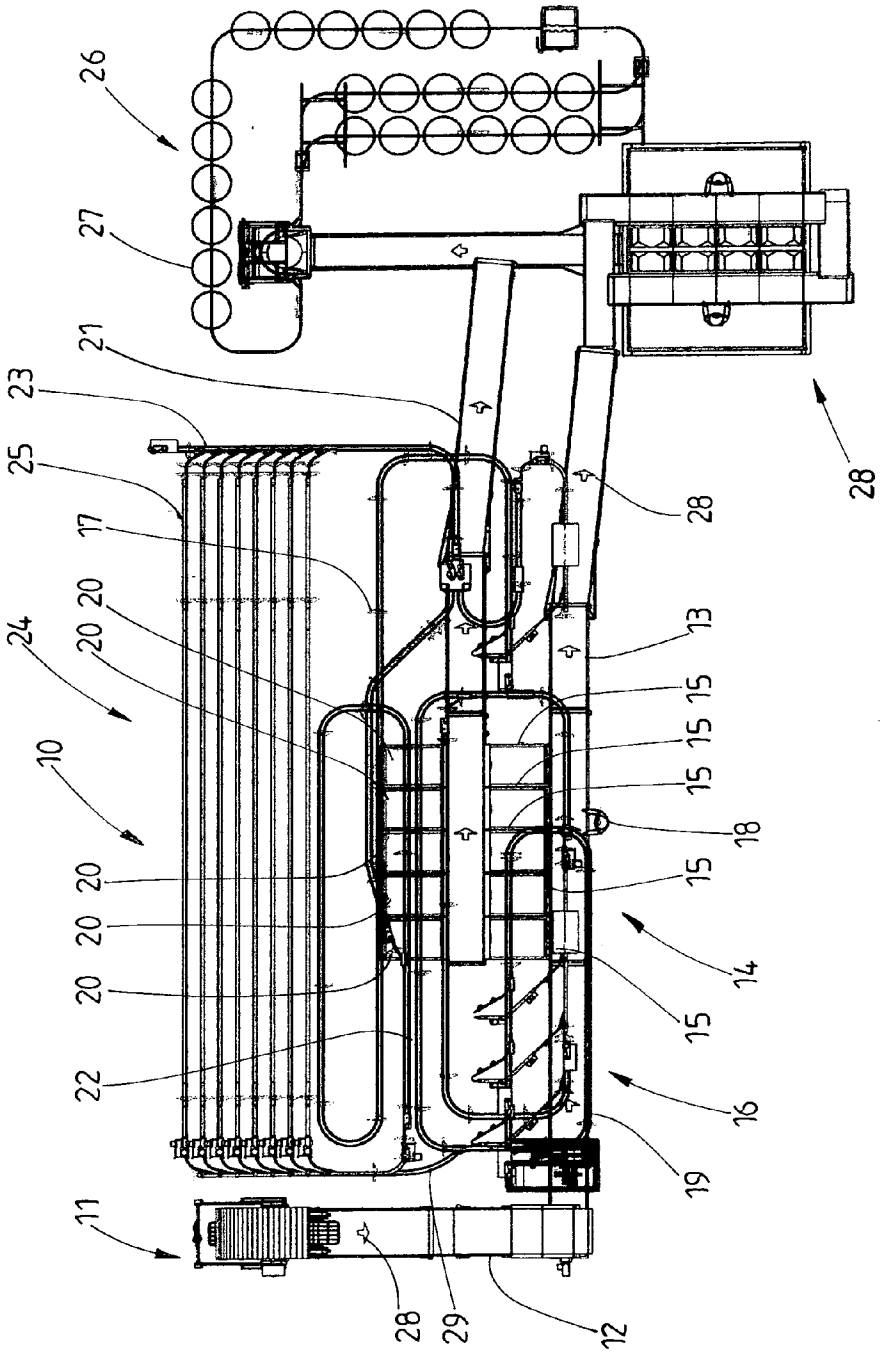

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Fig.1