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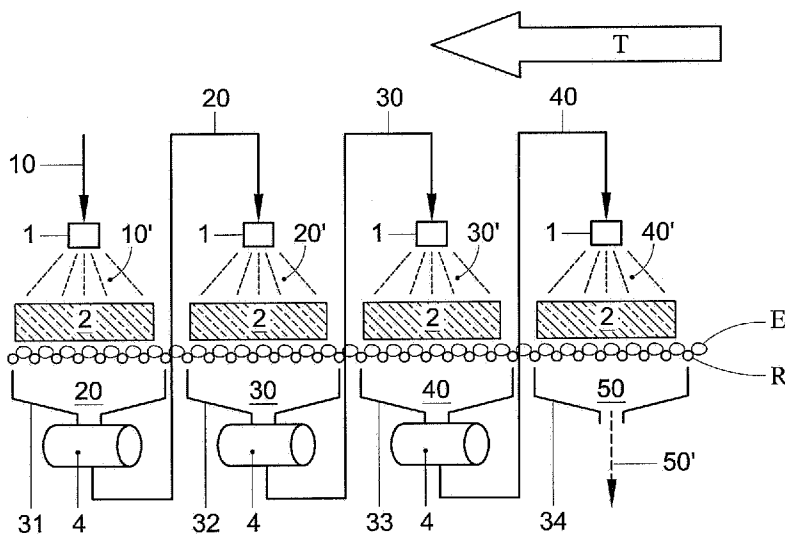
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(54) Title: WASHING EGGS



(57) Abstract: The present invention relates to an apparatus for washing eggs, wherein the eggs are conveyed by an endless roller conveyor in conveying direction T, wherein the roller conveyor is transmissive to a washing fluid, wherein the roller conveyor passes said apparatus, and wherein, all eggs are sprayed, by a washing fluid sprayer, with a washing fluid with substantially the same composition for all passing eggs, wherein the washing fluid sprayer comprises at least two sprayer units arranged above the conveyor in conveying direction, wherein a well-defined flow of washing fluid is set against the conveying direction onto the eggs, namely via the said at least first unit, and then, after collection and supply of said washing fluid of the said well-defined flow, to the at least second unit onto eggs following in upstream direction. With such an apparatus, a well-settable and controllable fluid flow is obtained.

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Title: Washing eggs.

The present invention relates to an apparatus for washing eggs.

Such an apparatus is known from US 4,985,956 in which, above a well-defined part of an egg conveyor, in succession, alternately, sprayers and brushes are arranged. This succession starts and ends with a single spray
5 portion. For the washing cycle used here, the washing liquid is supplied to the washing unit as a whole and used only once. The amount of washing liquid, mostly water and optionally water with additions used in such an apparatus, is enormous. In situations where large sorting machines are deployed, i.e. machines processing more than 100k eggs per hour, this means both a large
10 burden to the water supply and huge costs for the user.

Further, in this technology, washers are utilized that operate according to the principle, or strongly resembling the principle, represented hereinafter in Fig. 1. This technology has in common with the one mentioned hereinabove that substantially one single large collecting reservoir is used as
15 also known from US 4985965, with, further, a partition. In both variants, the eggs are supplied in the usual manner and conveyed with a roller conveyor.

In Fig. 1, an apparatus is represented in which by a single sprayer unit, fresh washing liquid or washing fluid is supplied. In this set-up, upstream, three further units are used. Basically, all liquid or fluid is collected
20 in the same large reservoir with an overflow edge after the first two units. After use of the fresh liquid, the liquid from the corresponding part of the reservoir is directly reused downstream. In the second part of the reservoir, the liquid is distributed over the two units and reused. At the upstream end of the reservoir, there is an overflow for discharging liquid having ended up
25 there.

With such a type of washing apparatus, the washing result is not clear because of the manner the washing liquid is reused. Although the eggs farthest downstream are always washed with fresh liquid, the eggs in the

preceding stages are sprayed with liquid already used, the degree of pollution of which can vary greatly. More particularly, the through-flow for freshening can be so poor that, stepwise, not mildly but highly polluted washing liquid is reused. This causes the final washing result to be greatly variable and
5 unpredictable.

In order to avoid these shortcomings, the invention provides an apparatus for washing eggs, wherein the apparatus is provided with:

- an endless roller conveyor, which extends in a conveying direction and which, in use, conveys the eggs in the conveying direction;
- 10 • at least two sprayer units, arranged above the roller conveyor in succession viewed in the conveying direction, each provided with a fluid supply opening for, in use, supplying washing fluid to the respective sprayer unit,

wherein the roller conveyor is transmissive to washing fluid, wherein under
15 each sprayer unit a washing fluid collector corresponding therewith is arranged, wherein each washing fluid collector is provided with a discharge opening, wherein, apart from the washing fluid collector farthest upstream, the discharge opening of each fluid collector is in fluid communication with the fluid supply opening of a sprayer unit which, viewed in the conveying
20 direction, is directly upstream from the sprayer unit corresponding to the respective washing fluid collector.

With such an apparatus, in use, a well-defined flow of washing fluid is obtained, while downstream the sprayer unit, viewed in conveying direction, can be fed with fresh washing fluid, and wherein the sprayer units located
25 further upstream are fed with washing fluid coming from the washing fluid collector of the sprayer unit located directly downstream therefrom. The eggs located downstream on the conveyor are therefore sprayed with fresh washing fluid. As they lie further upstream, the eggs located further upstream on the conveyor are sprayed with more and more frequently reused washing fluid.

With the apparatus according to the invention, a well-defined and well-settable flow of washing fluid is obtained in a very suitable manner.

In a further embodiment, the apparatus according to the invention is characterized in that the apparatus comprises n sprayer units, n being a natural number greater than 2, wherein, by sprayer unit k washing fluid is reused, substantially coming from the downstream sprayer unit $(k+1)$.

With such an embodiment, in particular with a larger number of sprayer units disposed in succession in conveying direction, it is effected that the eggs located on the conveyor are sprayed with, each time, cleaner washing fluid. This in contrast with the apparatus according to the state of the art, whereby the degree of pollution of the washing fluid dispensed by the sprayer units could be highly variable, leading to an unpredictable washing result.

According to a still further embodiment of the invention, in each fluid communication between a discharge opening and a sprayer unit, a washing fluid pump is arranged.

It can thus be effected that in each fluid collector a desired level of washing fluid is maintained.

Further details will be described with reference to Figs. 1 and 2, wherein

Fig. 1 schematically shows an embodiment according to the prior art, and

Fig. 2 schematically shows an exemplary embodiment according to the invention.

In the different Figures, the same pieces or parts have the same reference numerals.

Fig. 1 schematically shows a few details of the above-described apparatus from the prior art. Eggs E , lying, in a generally known manner, on and being conveyed by rollers R of an endless roller conveyor, are passed in conveying direction T through a washer. More particularly, the eggs E are passed along a washing device with four sprayer units 1, while successive

washing fluid flows 10, 20 and 30 are utilized. The sprayer units 1 provide spray flows 10', 20', and 30'. These spray flows cooperate with brushes 2, for instance by passing the eggs, moistened by the spray flows, under and somewhat through the brushes, or by directly spraying the brushes with washing fluid. The substantially first flow 10-10' is collected and reused as second flow 20 by a pump 4. In the depicted large reservoir, a partition 5 is arranged, aiming to provide a division between liquid amounts downstream and upstream. The degree of supply of the first flow 10 to side of the washer farthest downstream is determinative of the degree of overflow from the downstream side to the upstream side. After the overflow over the partition, the then collected liquid is reused, with a similar pump 4, as a flow 30 as spray flow 30', and sprayed over the eggs then arriving in the washer on the upstream side. On the upstream side of the reservoir, the most strongly polluted liquid is further discharged via an overflow 6 as flow 4, to be, for instance, purified and to then be used again as a flow 10, or to be discharged completely. As already stated hereinabove, the composition of this washing fluid flow will vary greatly, due to, substantially, differences in the extent of pollution of the eggs. It is further noted that at the start, such flows can have several desired compositions, in particular with respect to additions such as cleaning agents.

Fig. 2 schematically shows a washing device for eggs according to the invention. Here, the liquid flows are guided such that for each brush compartment, a receptacle 31, 32, 33, 34 is used and that the liquid collected therein is used as washing fluid for the following upstream sprayer unit. More particularly, the farthest downstream fresh flow 10 provides a spray flow 10' which is collected as liquid 20 and is thus reused as next washing fluid 20. This collected liquid 20 is pumped by a pump 4 to the next sprayer unit and sprayed as spray flow 20' over subsequent eggs supplied in the direction T. In the fourth compartment, washing fluid 40 provides a spray flow 40' that is collected as liquid 50 whereupon the then discharged flow 50' can, for instance,

be purified and reused, or, can, also, be discharged. In an advantageous manner, thus, a fluid flow is obtained exhibiting a clear and controllable course of extent of pollution.

5 It will be clear to all skilled in the art that if desired, other numbers of compartments can be selected, generally n , having, from the preceding to a following, in upstream direction, the numbers $(k + 1)$, i.e., all as natural numbers. Compositions of liquids can be adjusted as required. Further, a drawn diagram can be repeated so that after, for instance, four compartments with fresh fluid, washing is continued.

10 Minor modifications in the set-up of the respective parts as shown in the apparatus according to the invention are understood to be included within the protective scope of the following claims.

Claims

1. An apparatus for washing eggs, wherein the apparatus is provided with:

- an endless roller conveyor, which extends in a conveying direction and which, in use, conveys the eggs in the conveying direction;

5 • at least two sprayer units, arranged above the roller conveyor, in succession, viewed in the conveying direction, each provided with a fluid supply opening for, in use, supplying washing fluid to the respective sprayer unit,

wherein the roller conveyor is transmissive to washing fluid, wherein, under
10 each sprayer unit, a washing fluid collector corresponding therewith is arranged, wherein each washing fluid collector is provided with a discharge opening, wherein, apart from the washing fluid collector farthest upstream, the discharge opening of each washing fluid collector is in fluid communication with the fluid supply opening of a sprayer unit which, viewed in the conveying
15 direction, is directly upstream of the sprayer unit corresponding with the respective washing fluid collector.

2. An apparatus for washing eggs, wherein the eggs are conveyed with an endless roller conveyor in conveying direction T, wherein the roller conveyor is transmissive to a washing fluid, wherein the roller conveyor passes
20 the said apparatus, and wherein all eggs are sprayed by a washing fluid sprayer with washing fluid with substantially the same composition for all passing eggs,

characterized in that

the washing fluid sprayer comprises at least two sprayer units provided above
25 the conveyor in the conveying direction, wherein a well-defined flow of washing fluid is set against the conveying direction onto the eggs, namely via the said at least first unit, and then, after collection and supply of said washing fluid of

the said well-defined flow, to the at least second unit onto eggs following in upstream direction.

3. An apparatus according to claim 1 or 2, characterized in that the fluid supply opening of the sprayer unit farthest downstream, viewed in conveying direction, is connected to a source of fresh washing fluid.
- 5 4. An apparatus according to any one of claims 1 – 3, characterized in that the apparatus comprises n sprayer units, n being a natural number greater than 2, wherein by sprayer unit k washing fluid is reused substantially coming from the downstream sprayer unit $(k+1)$.
- 10 5. An apparatus according to claim 1, wherein in each fluid communication between a discharge opening and a sprayer unit a washing fluid pump is arranged.

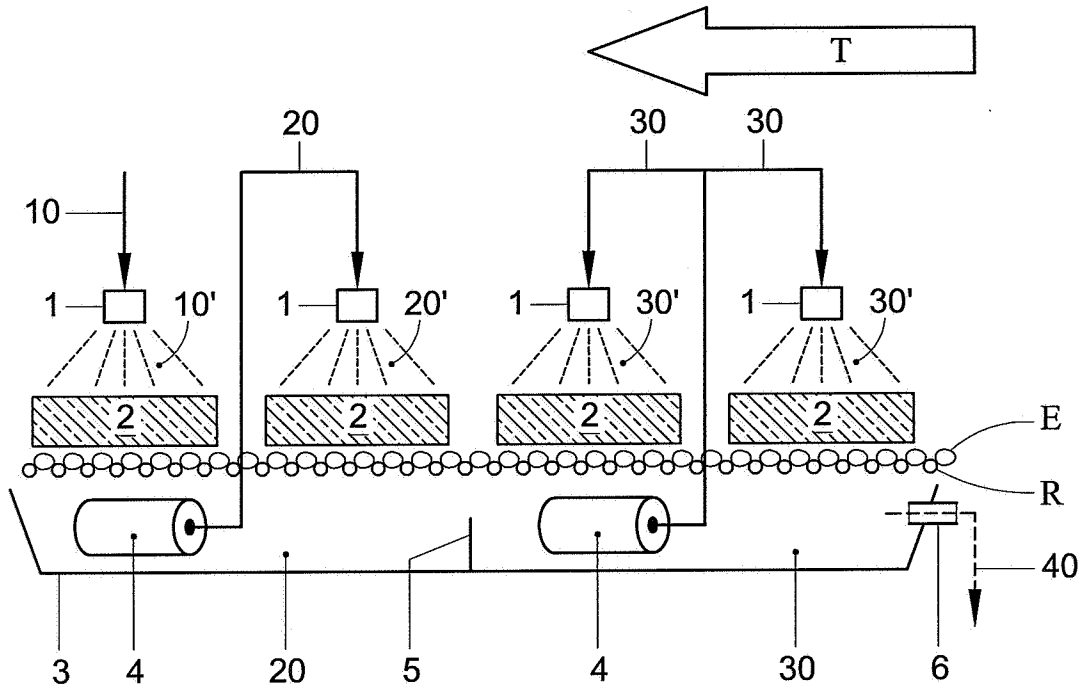


Fig. 1

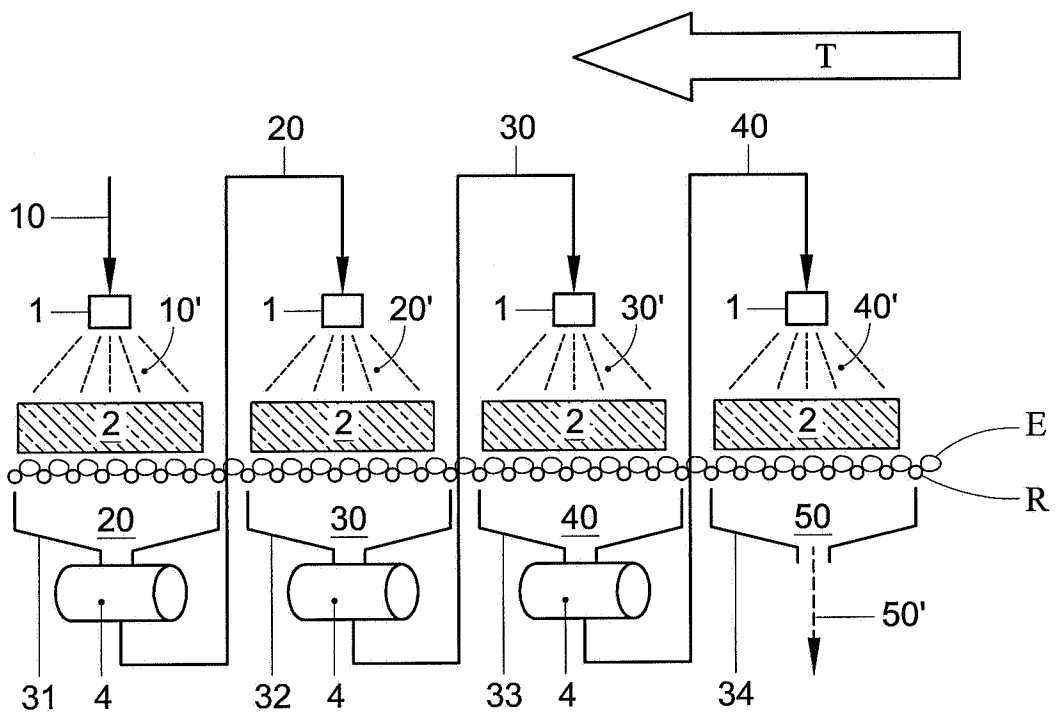


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2007/050129

A. CLASSIFICATION OF SUBJECT MATTER INV. A01K43/00				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) A01K				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, PAJ, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	US 6 821 353 B1 (KUHLE JEFFREY B [US]) 23 November 2004 (2004-11-23) column 7, line 27 - line 34 column 7, line 60 - line 65 column 9, line 38 - line 50 -----	1-5		
A	US 4 985 956 A (VAN DER SCHOOT JELLE [NL]) 22 January 1991 (1991-01-22) cited in the application the whole document -----	1-5		
A	US 3 621 503 A (CLASSEN ALVIN T) 23 November 1971 (1971-11-23) the whole document -----	1-5		
<input type="checkbox"/> Further documents are listed in the continuation of Box C.				
<input checked="" type="checkbox"/> See patent family annex.				
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<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; border: none; vertical-align: top;"> *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family </td> </tr> </table>			*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
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Date of the actual completion of the international search <p style="text-align: center; font-size: 1.2em;">5 July 2007</p>	Date of mailing of the international search report <p style="text-align: center; font-size: 1.2em;">17/07/2007</p>			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <p style="text-align: center; font-size: 1.2em;">Van Woensel, Gerry</p>			

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/NL2007/050129
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