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(54) APPARATUS FOR FILLING EGG TRAYS

APPARAT ZUM BEFÜLLEN VON EIERTRAYS

APPAREIL PERMETTANT DE REMPLIR DES CASIERS À OEUFS

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Description

Field of the invention.

[0001] The invention relates to an apparatus for filling egg trays, comprising feeding means for feeding eggs, as well as a plurality of spaced, adjacent partitions arranged directly above the feeding means and/or seen in the direction of feed arranged directly behind the feeding means, which partitions extend in the direction of feed and form the side walls of gates to transport means for further transport of the eggs, the apparatus further including displacement means for alternately moving the partitions to and fro in the direction of feed. The feeding means are often arranged as a belt conveyor and the transport means are often arranged as two spaced endless elements with rollers extending between them.

State of the art.

[0002] A transport system of this type is known from NL-C2-1016852. In this known system it may happen that an egg does not pass through a gate between two neighbouring partitions, but gets stuck between the end of a partition and a further egg partially present in the gate. Despite the fact that the partitions move to and fro relative to the feeding means, a gate may get blocked in this way. The known transport system further comprises egg transfer means, which catch the eggs and place them into an egg tray.

Summary of the invention.

[0003] It is an object of the invention to provide an apparatus of the type defined in the opening paragraph in which the gates cannot get blocked and the eggs are very gradually placed into egg trays which can be suitably displaced. To this end the invention is characterised in that the partitions form at least two groups with a partition of one group being placed beside a partition of the other group and the displacement means being arranged such that they do not simultaneously move the two groups to and fro in the same direction and at the same velocity, and in that egg transfer means are positioned behind the transport means seen in the direction of transport, which egg transfer means catch the eggs and place them into an egg tray, which apparatus further includes further transport means for the eggs tray, while the egg tray and the egg transfer means are moving along at equal or substantially equal velocity when the eggs are placed into the egg tray, which egg trays each comprises a matrix of interconnected bowl-shaped egg holders and which further transport means comprise two endless transport elements with rotary rollers extending between them, the spacing between the rollers being equal to the space between two consecutive rows of eggs holders, and the egg trays with each row of egg holders are carried by the further transport means between two neighbouring rollers. In consequence, the eggs are very gradually placed into the eggs trays, so that the chance of ears breaking is substantially excluded, and the egg trays can be suitably displaced by means of a rod conveyor of two endless transport elements with rotary rollers extending between them, the spacing between the rollers being equal to the space between two consecutive rows of egg holders. The egg trays with each row of egg holders are then carried by the further transport means between two neighbouring rollers. An apparatus in which the partitions form at least two groups with a partition of one group being placed beside a partition of the other group and the displacement means being arranged such that they do not simultaneously move the two groups to and fro in the same direction and at the same velocity, is known from US-A-3 369 644. By not moving two neighbouring partitions forwards and backwards simultaneously, the egg being in contact with one partition is not moved in the same way as the egg being in contact with the other partition, so that the two eggs are shifted relative to each other and the egg that got stuck between the partition and the further egg comes loose, so that the gates cannot get blocked.

[0004] For example, the partitions of one group can be stationary whereas those of the other group are moved to and fro. However, the displacement means are preferably arranged such that they move the partitions of one group in opposite direction to that of the partitions of the other group.

[0005] In order to prevent an end of a partition from stopping an egg, each partition end present upstream in the direction of feed is provided with a protruding element which is present in the plane of the partition and at a level directly above the feeding means, while an extremity bordering on the free end of each protrusion, seen in side view, has a bevelled top. As a result of this bevelled protrusion on the partition, an egg hitting this protrusion always turns away and never ends up lying against the partition.

[0006] An embodiment of the apparatus according to the invention is characterised in that detection means are positioned at a distance from the partitions in the direction of feed, which detection means are capable of detecting the presence of eggs in a direction transverse to the direction of feed and which detection means are coupled to regulating means which are capable of regulating the velocity of the feeding means. This avoids supplying such a quantity of eggs that the eggs are accumulating at the gates.

[0007] A further embodiment of the apparatus according to the invention is characterised in that ducts separated from one another by walls are provided behind the gates, which walls extend above the transport means in the direction of transport, further detection means being positioned at each gate, which further detection means are coupled to control means for the transport means, the control means activating the transport means only if an egg is lying under each gate. As a result, each time a complete row of eggs is fed, so that the filling of the

egg trays can be carried out in optimum fashion.

Brief description of the drawings.

[0008] The invention will now be described in more detail based on an example of embodiment of the apparatus for filling egg trays according to the invention represented in the drawings, wherein:

Fig. 1 shows a perspective view of an embodiment of the apparatus according to the invention;
Fig. 2 shows a perspective view of a detail of the apparatus near the partitions;
Fig. 3 shows a side view of the detail shown in Fig. 2;
Fig. 4 shows a perspective view of a detail of the partitions of the apparatus;
Fig. 5 shows a plan view of the apparatus;
Fig. 6 shows a longitudinal section of the apparatus; and
Fig. 7 shows a detail of the apparatus near the egg transfer means.

Detailed description of the drawings

[0009] Fig. 1 shows a perspective view of an embodiment of the apparatus for filling egg trays. The apparatus 1 comprises feeding means 3 for feeding eggs, with connected thereto transport means 5 which transport the eggs to egg transfer means 7. The egg transfer means take the eggs leaving the transport means and place them into egg trays.

[0010] The feeding means 3 have an endless supply conveyor 9 which leads the eggs to gates 11. The side walls of these gates are foirmed by partitions 13 and 15, which extend in the direction of feed and are spaced beside one another. These partitions 13 are positioned directly above the feeding conveyor 9 near an end of the feeding conveyor 9. The partitions are positioned in two groups, a partition 13 of one group alternating with a partition 15 of the other group.

[0011] The partitions 13 are stationary and the partitions 15 are moved to and fro in the direction of feed by displacement means 17. For this purpose the partitions 15 are connected at the top by means of a cross-beam 19. This cross-beam is moved to and fro by an arm 21 which forms part of the displacement means, see Figs. 3 and 4.

[0012] Each partition 13, 15 has a protruding element 25 at the end 23 located upstream in the direction of feed, which protruding element 25 is present in the plane of the partition, see Fig. 4, which shows the partitions in detail. The protruding element is present at a level directly above the feeding conveyor. The part 27 of each protruding element 25 that adjoins the free end is beveled at the top, seen in side view.

[0013] The apparatus 1 comprises detection means 29, see Fig. 3, which are installed ahead of the partitions 13, 15 in the direction of feed. The detection means are arranged as a light source and a light-sensitive cell and detect the presence of eggs on the conveyor belt 9 in a direction transverse to the direction of feed. The detection means 29 are coupled to regulating means (not shown) which activate driving means (not shown either) and regulate the velocity of the belt conveyor 9 to avoid too many eggs accumulating at the partitions.

[0014] Behind the gates 11 there are ducts separated from each other by walls 31, see

[0015] Fig. 5, in which a plan view of the apparatus 1 is shown. In the direction of transport the walls 31 extend above the transport means 5. Further detection means 33 are positioned above every gate 11. These further detection means 33 are coupled to control means (not shown) for the transport means. The control means actuate the transport means only if an egg is situated under each gate 11.

[0016] The transport means 5 have a roller belt that is formed by two endless chains 35 with rotary rollers 37 between them which extend transversely to the direction of transport, see Fig. 5. During the operation of the roller belt the rollers 37 run over a strip 39 so that they are rotated. The spacing of the rollers 37 is such that the eggs rest on two rollers present behind one another. The eggs are displaced by the transport means 5 and rotated by the rollers 37 while being displaced. As a result, the eggs are displaced in the direction of their pointed ends until they end up against the walls 31.

[0017] Behind the transport means 5 there are guide elements 41 which are formed by strips, see Fig. 7. Once they have left the transport means 5 the eggs roll downwards over a sloping surface while their pointed ends are in rubbing contact with the guide elements 41. As a result, the eggs will turn their round ends forwards into the direction of transport.

[0018] The guide elements 41 comprise for example egg transfer means 7, see Fig. 6, in which a longitudinal section of the apparatus is shown. The egg transfer means 7 have claws 43 which take the eggs 45 by the round ends directed forwards and then place them with their pointed ends pointing down into an egg tray 47.

[0019] The apparatus 1 also includes further transport means 49 for egg trays. The further transport means 49 and the egg transfer means 7 move at the same velocity when the eggs 45 are placed into the egg tray, so that the claws 43 move along with the egg tray 47 when the eggs 45 are let go of. The further transport means 49 also comprise a roller belt which is also formed by two endless chains 51 with rotary rollers 53 extending between them.

[0020] Each egg tray 47 has a matrix of interconnected bowl-shaped egg holders while the distance between the rollers 53 is equal to the distance between two consecutive rows of egg holders, so that the egg trays 47 with each row of egg holders are present between two neighbouring rollers 53 and are carried by these rollers.

[0021] Albeit the invention has been described in the foregoing with reference to the drawings, it should be

observed that the invention is not by any manner or means restricted to the embodiments shown in the drawings. The invention also extends to all embodiments deviating from the embodiments shown in the drawings within the scope defined by the claims. For example, the partitions 13 may also be displaced by the displacement means. In that case preferably the partitions 13 of one group are moved in opposite direction to that of the partitions 15 of the other group.

Claims

1. An apparatus for filling egg trays, comprising feeding means (3) for feeding eggs, as well as a plurality of spaced, adjacent partitions (13, 15) arranged directly above the feeding means and/or seen in the direction of feed arranged directly behind the feeding means, which partitions extend in the direction of feed and form the side walls of gates (11) to transport means (5) for further transport of the eggs, the apparatus further including displacement means (17) for alternately moving the partitions to and fro in the direction of feed, **characterised in that** the partitions (13, 15) form at least two groups with a partition of one group being placed beside a partition of the other group and the displacement means (17) being arranged such that they do not simultaneously move the two groups to and fro in the same direction and at the same velocity, and **in that** eggs transfer means (7) are positioned behind the transport means (5) seen in the direction of transport. which egg transfer means catch the eggs and place them into an egg tray (47), which apparatus further includes further transport means (49) for the egg tray, while the egg tray (47) and the egg transfer means (7) are moving along at equal or substantially equal velocity when the eggs are placed into the egg tray, which egg trays (47) each comprises a matrix of interconnected bowl-shaped eggs holders and which further transport means comprise two endless transport elements (51) with rotary rollers (53) extending between them, the spacing between the rollers being equal to the space between two consecutive rows of egg holders, and the egg trays with each row of egg holders are carried by the further transport means between two neighbouring rollers.

2. An apparatus as claimed in claim 1, **characterised in that** the displacement means (17) are arranged such that they move the partitions (13) of one group in opposite direction to that of the partitions (15) of the other group.

3. An apparatus as claimed in claim 1 or 2, **characterised in that** each partition end (23) present upstream in the direction of feed is provided with a protruding element (25) which is present in the plane of the partition and at a level directly above the feeding means (3), while an extremity (27) bordering on the free end of each protrusion, seen in side view, has a beveled top.

4. An apparatus as claimed in claim 1, 2 or 3, **characterised in that** detection means (29) are positioned at a distance from the partitions (13, 15) in the direction of feed which detection means are capable of detecting the presence of eggs in a direction transverse to the direction of feed and which detection means are coupled to regulating means which are capable of regulating the velocity of the feeding means (3).

5. An apparatus as claimed in any one of the preceding claims, **characterised in that** ducts separated from one another by walls are provided behind the gates (11), which walls extend above the transport means in the direction of transport, further detection means (33) being positioned at each gate, which further detection means are coupled to control means for the transport means (5), the control means activating the transport means only if an egg is lying under each gate.

Patentansprüche

1. Vorrichtung für die Beschickung von Eierhorden, welche Zubringermittel (3) für die Zufuhr von Eiern sowie mehrere im Abstand nebeneinander direkt über den Zubringermitteln angeordneten und/oder in Zufuhrrichtung gesehen direkt hinter den Zubringermitteln angeordnete Schotts (13, 15) umfasst, die sich in Zufuhrrichtung erstrecken und die Seitenwände von Einlauföffnungen (11) zu Fördermitteln (5) für den Weitertransport der Eier bilden, wobei die Vorrichtung ferner Positionierungsmittel (17) umfasst, mit denen die Schotts in Zufuhrrichtung abwechselnd hin und her bewegt werden können, **dadurch gekennzeichnet, dass** die Schotts (13, 15) mindestens zwei Gruppen bilden, wobei abwechselnd ein Schott einer der Gruppen neben einem Schott der anderen Gruppe angeordnet ist und die Positionierungsmittel (17) so ausgeführt sind, dass die beiden Gruppen davon nicht gleichzeitig in die gleiche Richtung und mit der gleichen Geschwindigkeit hin und her bewegt werden, und dass Greifmittel (7) in Förderrichtung gesehen hinter den Fördermitteln (5) angeordnet sind und die mit dem stumpfen Ende zuerst aus den Fördermitteln transportierten Eier von den Greifmitteln aufgenommen und anschließend mit dem spitzen Ende nach unten in einer Horde (47) abgelegt werden, wobei die Vorrichtung ferner weitere Fördermittel (49) für die Horde umfasst und sich die Horde (47) und die Greifmittel (7) bei der Ablage der Eier in der Horde mit gleicher oder

nahezu gleicher Geschwindigkeit fortbewegen, wobei die Horden (47) jeweils eine Matrix aus miteinander verbundenen schalenförmigen Eierhaltern umfassen, wobei die weiteren Fördermittel zwei Endlos-Förderelemente (51) umfassen, zwischen denen sich rotierende Walzen (53) erstrecken, deren Zwischenabstand dem Zwischenabstand von zwei hintereinander angeordneten Reihen von Eierhaltern entspricht, und wobei die Horden mit jeder Reihe von Eierhaltern zwischen zwei benachbarten Walzen von den weiteren Fördermitteln getragen werden.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Positionierungsmittel (17) so ausgeführt sind, dass davon die Schotts (13) einer der Gruppen entgegengesetzt zu den Schotts (15) der anderen Gruppe bewegt werden.

3. Vorrichtung nach einem der Ansprüche 1 oder 2, **dadurch gekennzeichnet, dass** jedes Schott an seinem gegen den Eierstrom gerichteten Ende (23) mit einem vorstehenden Teil (25) versehen ist, das sich in der Ebene des Schotts befindet und auf einem direkt über den Zubringermitteln (3) befindlichen Niveau angeordnet ist, wobei ein an das freie Ende (27) grenzender Bereich eines jeden vorstehenden Teils seitlich betrachtet an der Oberseite abgeschrägt ist.

4. Vorrichtung nach einem der Ansprüche 1, 2 oder 3, **dadurch gekennzeichnet, dass** in Zufuhrrichtung gesehen im Abstand zu den Schotts (13, 15) Detektoren (29) vorhanden sind, die in einer quer zur Zufuhrrichtung verlaufenden Richtung Eier erkennen können und mit Regelmitteln gekoppelt sind, mit denen die Geschwindigkeit der Zubringermittel (3) geregelt werden kann, um zu verhindern, dass sich vor den Schotts zu viele Eier stauen.

5. Vorrichtung nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** sich hinter den Einlauföffnungen (11) durch Wände voneinander getrennte Gänge befinden, wobei sich die Wände oberhalb der Fördermittel in Förderrichtung erstrecken und an jeder Einlauföffnung weitere Detektoren (33) vorhanden sind, die mit Steuermitteln für die Fördermittel (5) gekoppelt sind, und wobei die Fördermittel nur dann von den Steuermitteln aktiviert werden, wenn sich unter jeder Einlauföffnung ein Ei befindet.

Revendications

1. Dispositif pour le remplissage de plateaux à oeufs, comprenant des moyens d'approvisionnement (3) pour l'apport d'oeufs, ainsi qu'un certain nombre de cloisons (13, 15) se trouvant côte à côte et à distance les unes des autres directement au dessus des moyens d'approvisionnement, et/ou se trouvant, vu dans le sens d'approvisionnement, directement derrière les moyens d'approvisionnement, et s'étendant dans le sens d'approvisionnement, où les cloisons forment les parois latérales de portes (11) allant vers des moyens de transport (5) pour le transport plus avant des oeufs, lequel dispositif comprend en outre des moyens de déplacement (17), pour déplacer les cloisons en alternance d'avant en arrière dans le sens d'approvisionnement, **caractérisé en ce que** les cloisons (13, 15) forment au moins deux groupes, où une cloison de l'un des groupes se trouve en alternance à côté d'une cloison de l'autre groupe, et où les moyens de déplacement (17) sont réalisés de telle façon qu'ils déplacent les deux groupes d'avant en arrière dans le même sens et avec la même vitesse de façon non simultanée, et **en ce que** des moyens de reprise (7) se trouvent, vu dans le sens de transport, derrière les moyens de transport (5), lesquels moyens de reprise saisissent les oeufs venant des moyens de transport et ayant leurs extrémités aplaties dirigées vers l'avant et les posent ensuite, extrémités pointues dirigées vers le bas, dans un plateau à oeufs (47), lequel dispositif comprend en outre d'autres moyens de transport (49) pour le plateau à oeufs, où le plateau à oeufs (47) et les moyens de reprise (7) se déplacent, pendant la pose des oeufs dans le plateau à oeufs, avec la même ou presque la même vitesse, lesquels plateaux à oeufs (47) comprennent chacun une matrice de supports à oeufs en forme de bol reliés les uns aux autres, et les autres moyens de transport comprennent deux éléments de transport (51) sans fin avec des rouleaux tournants (53) s'étendant entre eux deux, où la distance entre les rouleaux est identique à la distance entre deux rangées de supports à oeufs se trouvant l'une derrière l'autre, et, entre deux rouleaux voisins, les plateaux à oeufs avec chaque rangée de supports à oeufs sont portés par les autres moyens de transport.

2. Dispositif selon la revendication 1, **caractérisé en ce que** les moyens de déplacement (17) sont réalisés de telle façon qu'ils déplacent les cloisons (13) de l'un des groupes dans le sens contraire de celui des cloisons (15) de l'autre groupe.

3. Dispositif selon la revendication 1 ou 2, **caractérisé en ce que** chaque cloison se trouvant à l'extrémité (23) en amont dans le sens d'approvisionnement est pourvue d'une partie saillante (25) qui se trouve dans le plan de la cloison et qui se trouve à un niveau directement au dessus des moyens d'approvisionnement (3), où, vu en plan de profil, un segment de chaque partie saillante et limitrophe de l'extrémité libre (27) est biseauté en son côté supérieur.

4. Dispositif selon la revendication 1, 2 ou 3, **caractérisé en ce que** dans le sens d'approvisionnement à distance devant les cloisons (13, 15) se trouvent des moyens de détection (29) qui peuvent détecter la présence d'oeufs dans une direction transversale à celle d'approvisionnement, et qui sont couplés à des moyens d'ajustement pouvant ajuster la vitesse des moyens d'approvisionnement (3) afin d'éviter que trop d'oeufs ne s'accumulent devant les cloisons.

5. Dispositif selon une des revendications précédentes, **caractérisé en ce que** derrière les portes (11) se trouvent des couloirs séparés les uns des autres par des parois, où les parois s'étendent au dessus des moyens de transport dans le sens de transport, où pour chaque porte se trouvent d'autres moyens de détection (33), qui sont couplés à des moyens de pilotage pour les moyens de transport (5), lesquels moyens de pilotage activent les moyens de transport uniquement dans le cas où il se trouve un oeuf sous chaque porte.

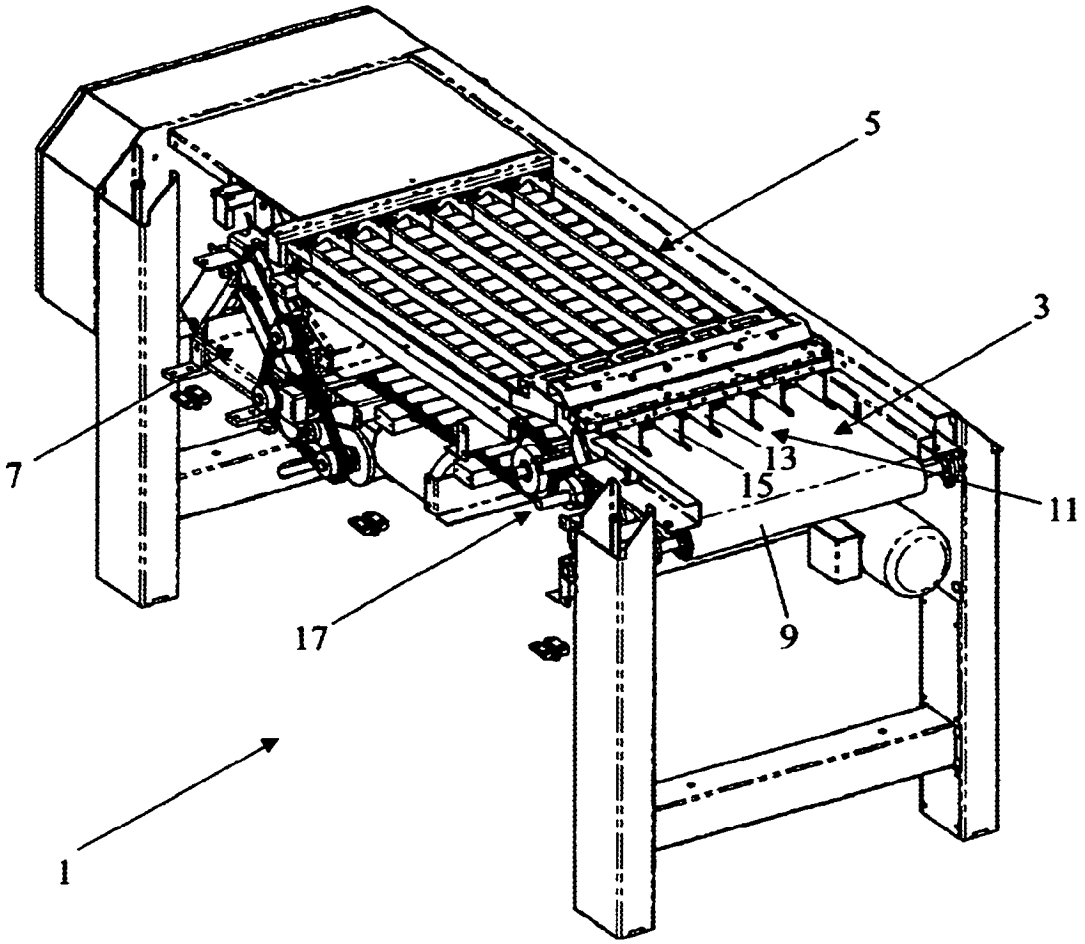


FIG. 1

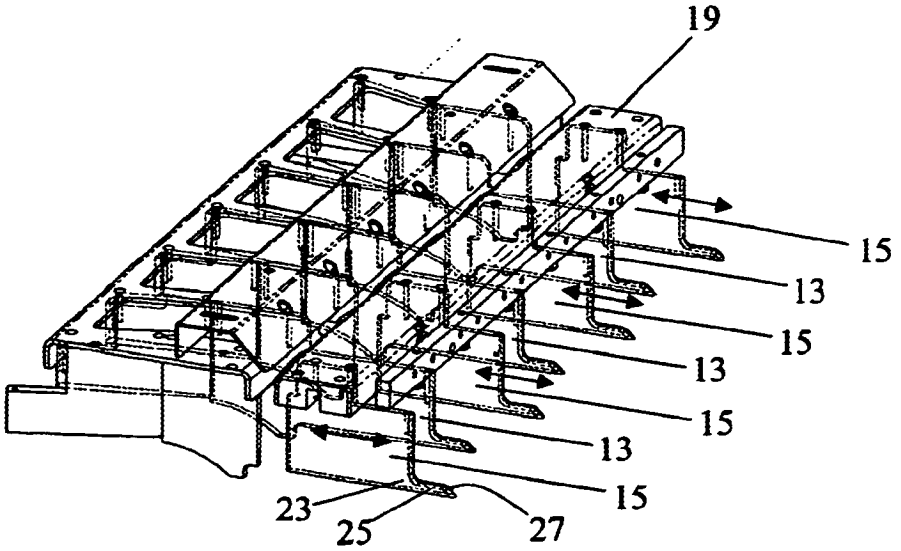


FIG. 2

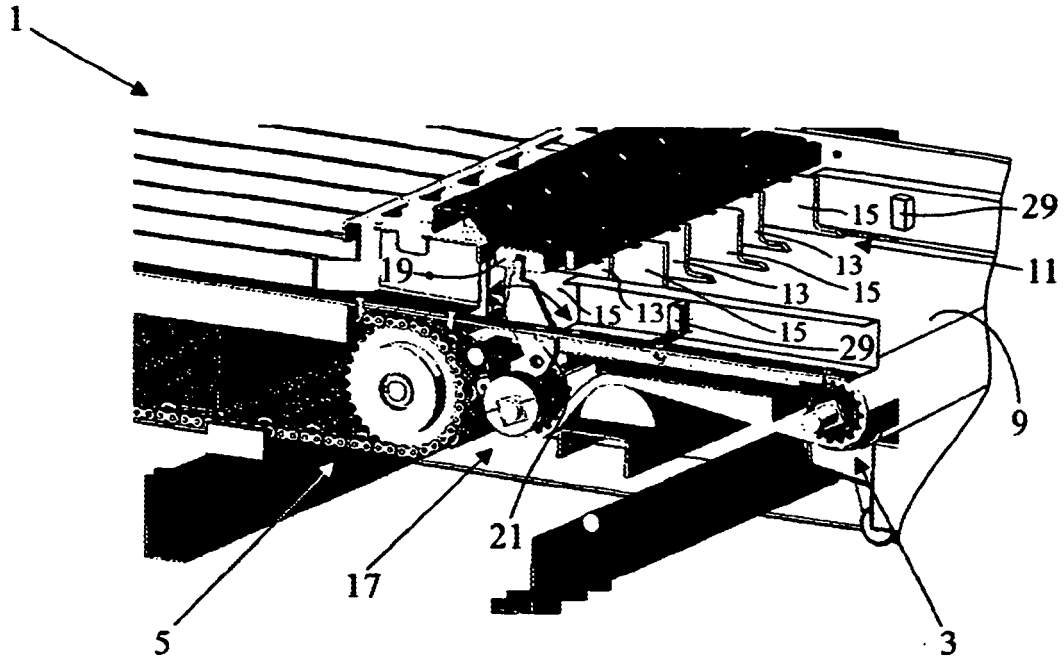


FIG. 3

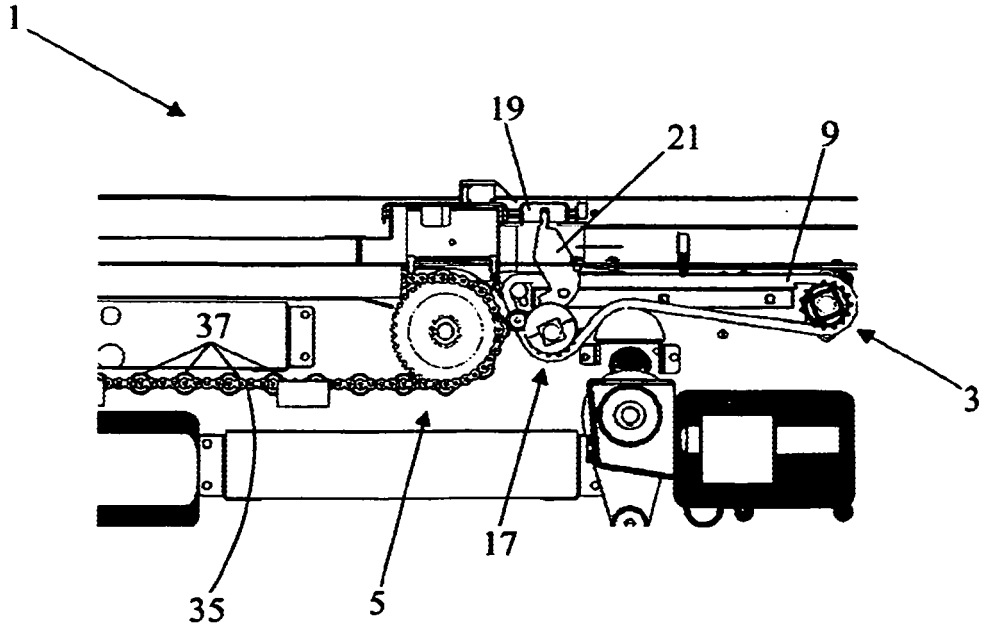


FIG. 4

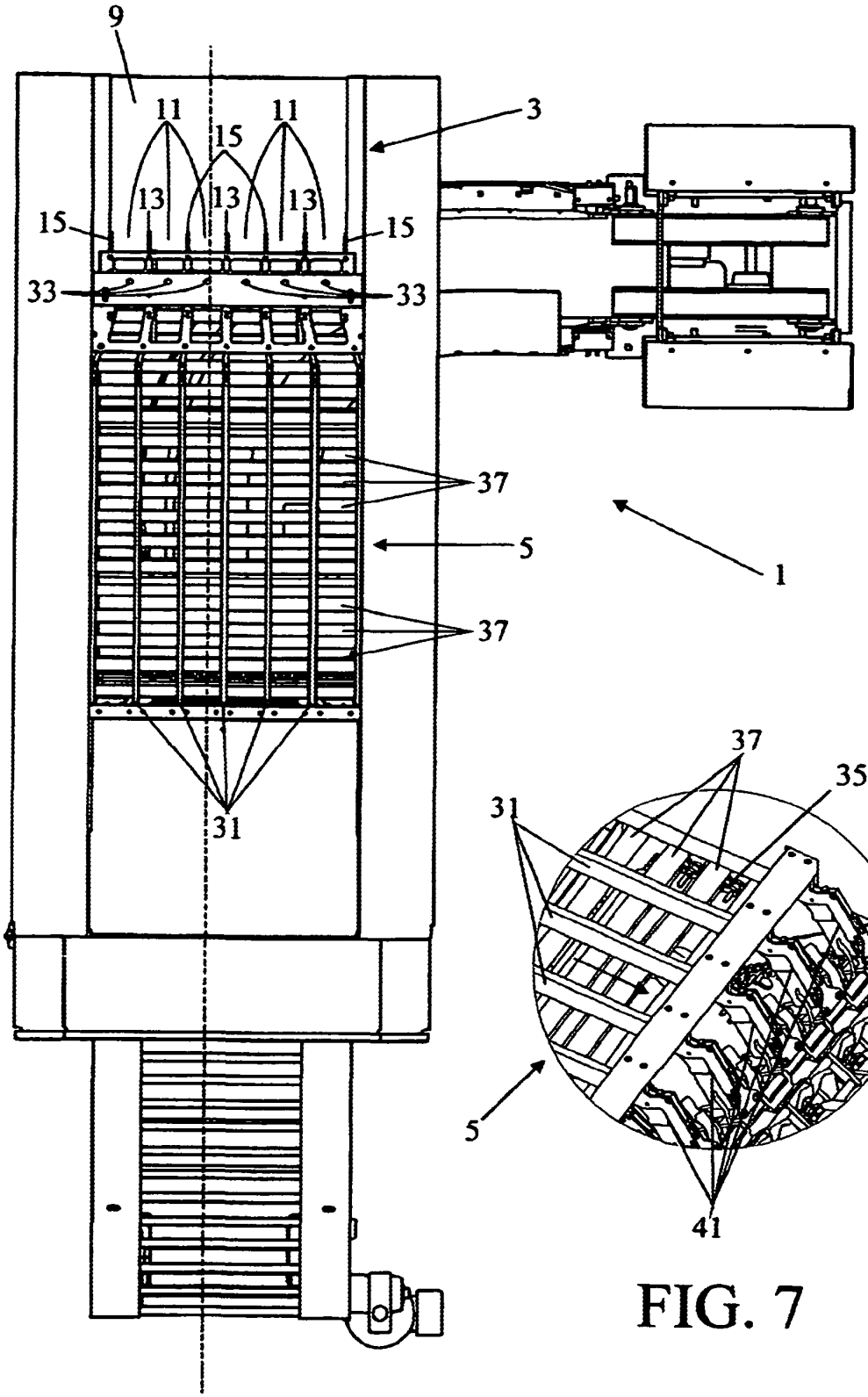


FIG. 5

FIG. 7

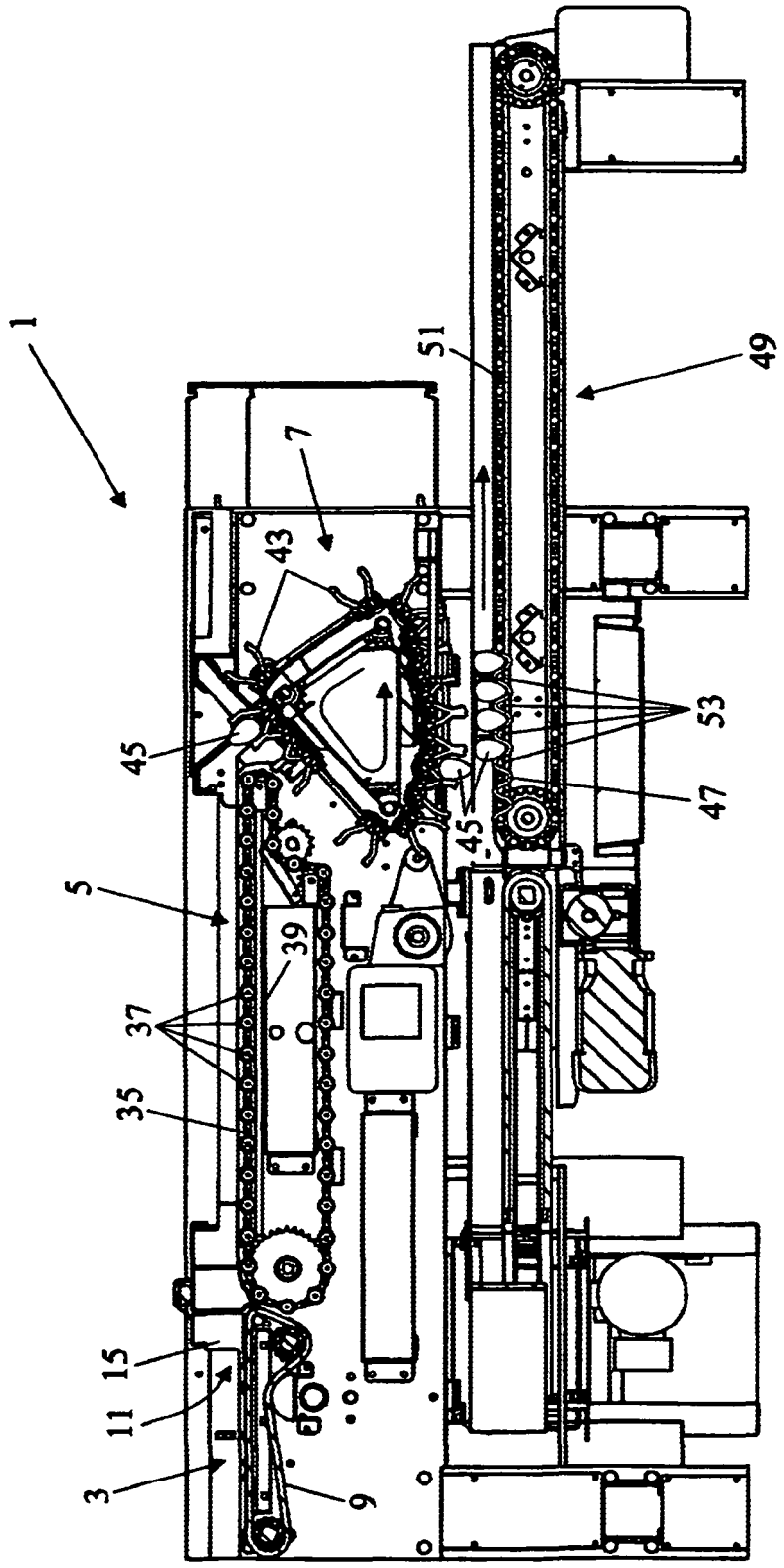


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- NL 1016852 C2 **[0002]**
- US 3369644 A **[0003]**