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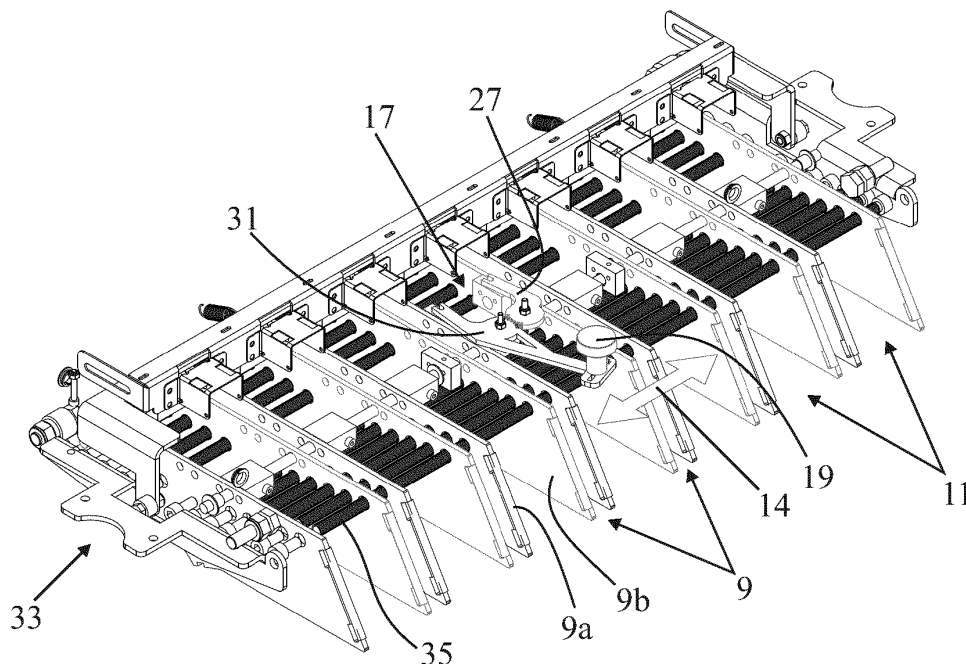
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### (54) PACKING DEVICE FOR FILLING EGG TRAYS

(57) A packing system 1 for filling egg trays comprises feeding means 5 for feeding eggs 7, as well as a plurality of spaced, adjacent partitions 9 located directly above the feeding means which extend in the direction of feed of the eggs, where the partitions form the side walls of gates 11 to transport means 13 for further transport of the eggs. Each gate is bounded by two unique partitions 9a and 9b, so that two partitions are located

between two adjacent gates of which one partition forms a boundary for the one gate and the other partition forms a boundary for the other gate.

The partitions can be displaced in a direction 14 at right angles to the partitions and the packing system comprises adapting means 17 for displacing the partitions, where the two partitions bounding a gate can be displaced towards each other and away from each other.



**FIG. 3**

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## Description

### Field of the invention

[0001] The invention relates to a packing system for filling egg trays, comprising feeding means for feeding eggs, as well as a plurality of spaced, adjacent partitions located directly above the feeding means and/or seen in the direction of feed located directly behind the feeding means, which partitions extend in the direction of feed and form the side walls of gates that lead to transport means for further transport of the eggs, and where each gate is bounded by two unique partitions *i.e.* a left hand partition and a right hand partition, so that two partitions are located between two adjacent gates of which one partition forms a boundary for the one gate and the other partition forms a boundary for the other gate.

### State of the art

[0002] A packing system of this type is known from WO2010126372A. For reducing the passage between the partitions the known packing system utilizes protruding elements which are placed on a partition.

### Summary of the invention

[0003] It is an object of the invention to provide a packing system of the type defined in the opening paragraph in which the width of the gates can be adapted in a faster and simpler manner. For this purpose the packing system according to the invention is characterized in that the partitions can be displaced in a direction at right angles to the partitions and the packing system comprises adapting means for displacing the partitions, where the two partitions bounding a gate can be displaced towards each other and away from each other. In this way the width of the gates can be adapted in a faster and simpler manner.

[0004] An embodiment of the packing system according to the invention is characterized in that all left hand partitions are rigidly connected to each other and all right hand partitions are rigidly connected to each other and the adapting means can simultaneously displace the partition pairs of all gates towards each other and away from each other. As a result, the width of all gates can be adapted simultaneously and to the same extent.

[0005] In an advantageous practical embodiment the adapting means comprise a single operating element by which all partitions can be adapted in a stepless manner, which operating element is located on a first arm which between its ends is partly provided with teeth which extend along a part of an arc of circle and are in meshing engagement with further teeth which extend along a part of a further arc of circle and are present on a part of a second arm, where each of the arms can be rotated around the centre of the imaginary circle running through the respective arc of circle, which arms are coupled with

one end to a left hand or right hand partition respectively.

[0006] A further embodiment of the packing system according to the invention is characterized in that the packing system further includes shaking fingers which are located ahead of the partitions and between a left hand and a right hand partition beside the gates in the direction in which the eggs are fed. These shaking fingers prevent the eggs from continuing to stay in front of and against the partitions and provide that the eggs are guided to the gates.

[0007] For avoiding eggs being damaged when they hit the shaking fingers, these fingers are provided with elastic or resilient contact means for receiving in a resilient manner eggs hitting the fingers during operation. In an advantageous embodiment the contact means are formed by helical springs.

[0008] For guiding the eggs better to the gates, the packing system further includes moving means for moving in the direction of feed of the eggs at least part of the shaking fingers in a direction from and towards the front of the partitions.

[0009] Still a further embodiment of the packing system according to the invention is characterized in that the packing system comprises height limiters which extend transversely between the left hand and right hand partitions of a gate and which are located during operation at a slight distance above the eggs transported between the partitions. These height limiters prevent eggs from rolling over one another during operation.

[0010] For avoiding damaged eggs the height limiters are preferably provided with further elastic or resilient contact means. These further contact means are preferably formed by further helical springs.

[0011] Again a further embodiment of the packing system according to the invention is characterized in that the packing system comprises at least two vertical pins which are incorporated in side partitions of at least one of the gates and which can be displaced by displacing means towards each other and away from each other. By displacing these pins to a position between the partitions, they block the gates and stop the eggs. In this way empty positions may optionally be created in the flow of eggs.

[0012] In an advantageous practical embodiment the displacing means comprise a further operating element which is located at an end of a further first arm which between its ends is partly provided with teeth which extend along a part of an arc of circle and are in meshing engagement with further teeth which extend along a part of a further arc of circle and are present on a part of a further second arm, where each of the further arms can be rotated around the centre of the imaginary circle running through the respective arc of circle, where one of the pins is present at an end of each further arm.

### Brief description of the drawings

[0013] The invention will now be described in more de-

tail based on an example of embodiment of the packing system according to the invention represented in the drawings, wherein:

Fig. 1 shows a perspective view of an embodiment of the packing system according to the invention with an enlargement of a part of the packing system;  
 Fig. 2 shows a detailed view of the packing system shown in Fig. 1;  
 Fig. 3 shows a perspective view of the gate construction;  
 Fig. 4 shows a top view of the gate construction;  
 Fig. 5 shows the gate construction with shaking fingers;  
 Fig. 6 shows the moving mechanism of the shaking fingers;  
 Fig. 7 shows the stop means in release position; and  
 Fig. 8 shows the stop means in stop position.

### Detailed description of the drawings

**[0014]** Fig. 1 shows a perspective view of an embodiment of the packing system for filling egg trays according to the invention with an enlargement of a part of the packing system. The latter part is further depicted in Fig. 2. The packing system 1 is provided with feeding means 5 which comprise a transport conveyor for feeding eggs 7. The system further includes a plurality of spaced, adjacent partitions 9 and located directly above the transport conveyor, which partitions extend in the egg feeding direction. These partitions form the side walls of gates 11 leading to transport means 13 for further transport of the eggs. These transport means 13 are provided with rollers which further transport the eggs.

**[0015]** Each gate is bounded by two unique partitions (see Figs. 3 and 4) being a left hand partition 9a and a right hand partition 9b, so that between two adjacent gates two partitions are located of which one forms a boundary of the one gate and the other forms the boundary of the adjacent gate. The partitions 9 can be displaced in a direction 14 at right angles to the partitions. The packing system 1 comprises adapting means 17 for displacing the partitions, where the two partitions 9a, 9b bounding a gate 11 can be displaced towards each other and away from each other. All left hand partitions 9a are rigidly connected to each other and all right hand partitions 9b are rigidly connected to each other. As a result the adapting means 17 can simultaneously displace the partition pairs 9a, 9b of all gates 11 towards each other and away from each other.

**[0016]** The adapting means 17 have a single operating element 19 by which all partitions 9 can be displaced in a stepless manner. This operating element is present on a first arm 21 which between its ends and over a part of the arm is provided with teeth 23 which extend along a part of an arc of circle and are in meshing engagement with further teeth 25 which extend along a further part of a further arc of circle and extend on a part of a second

arm 27. Each of the arms can rotate around the centre 24, 26 of the imaginary circle through the respective arc of circle. The arms are coupled with an end 21b, 27b to a left hand or right hand partition 9a, 9b, respectively.

**[0017]** The packing system further includes shaking fingers 29 (see Figs. 5 and 6) which in the direction of feed 30 of the eggs are located in front of the partitions and between a left hand and a right hand partition 9a, 9b beside the gates. The shaking fingers 29 are provided with elastic or resilient contact means 31 for elastically receiving eggs 7 hitting them during operation. The contact means 31 are formed by helical springs.

**[0018]** The packing system further includes moving means 33 for moving in the direction of feed 30 of the eggs 7 at least a plurality of the shaking fingers 29 in a direction from and towards the front of the partitions 9 (see Fig. 6). The moving means 33 have an eccentric 37 which is mounted to the drive shaft 38 of the feeder mat. Via a mechanical construction 39 a rotary motion is converted into a linear motion.

**[0019]** Furthermore, the packing system comprises height limiters 35 which extend transversely between the left hand and right hand partitions 9a, 9b of a gate 11 and are present at a small distance above the eggs 7 transported between the partitions during operation. These height limiters 35 are provided with further elastic or resilient contact means so as to avoid the eggs rolling over one another during operation. Also the further contact means are formed by further helical springs.

**[0020]** The packing system further includes stop means. Figs. 7 and 8 show these stop means in release position and stop position, respectively. The stop means may be mounted in each of the gates and each have two vertical pins 41 which are incorporated in partitions 42 of the gates 11. Displacing means 43 displace these pins towards each other and away from each other. These displacing means 43 have a further operating element 45 which is located at an end of a further first arm 47. Between the ends of this arm are located teeth 49 which extend along part of an arc of circle and are in meshing engagement with further teeth 51 which extend along part of a further arc of circle and extend on a part of a second arm 53. Each of the further arms can rotate around the centre 54 and 56 of the imaginary circle running through the respective arc of circle. One of the pins 41 is located at an end of each further arm.

**[0021]** The gates 11 guide the eggs 7 from the feeder mat of the feeding means to the rollers of the transport means 13, where the rollers are filled for 100%. The operation of the gates is as follows. The eggs arrive at the feeder mat where the attendant can perform a visual inspection. Via the gates 11 the eggs end up on the rollers 5, 6 or 7 abreast, depending on the packaging the eggs are to be packed in. The eggs are detected by sensors. Once all sensors have operated, the roller conveyor goes one step ahead. One complete row on the rollers is filled now. These steps are repetitive so as to reach 100% filled rollers. For improving the flow of the eggs the shak-

ing fingers 29 are located at the feeding side of the gates 11. The fingers are driven by the eccentric 37 which is mounted to the drive shaft 38 of the feeder mat. Since the size of the egg grows along with the age of the hen, the width of the passage of the gates is to be variable. The gates have a unique system by which a single operating element 19 is capable of manually adapting the width of all the gates 11. Displacement of the operating element in Fig. 3 to the left causes the passage to become narrower. Displacement of the operating element to the right causes the passage to become wider.

**[0022]** Spring steel helices for forcing the eggs through the gates are applied at two positions in the gates. The first helix is located at the head ends of the partitions. From this direction the eggs are heading for the gates. Since this takes place on a feeder mat the eggs hit the head ends of the gates which may lead to possible damage to the eggs. Since the eggs now hit the spring helices, the eggs are led through the gates in an egg-friendly way. Due to the resilience of the helices the eggs are not damaged and the friction to the egg is minimized, which is beneficial to the flow of the eggs.

**[0023]** The second set of spring helices is located above the eggs when the eggs are situated between the partitions. These spring helices prevent the eggs from ending on top of one another when the feeder mat is accumulated. The helices provide free movement of the eggs, but if the eggs tend to end on top of one another they are pushed back by the helices. Here too egg-friendliness is the cutting edge.

**[0024]** For filling specific trays/setter trays it is sometimes necessary to create an empty space on a roller (Figs. 7 and 8 illustrate this). For this purpose the two vertical pins 41 are present in the side partitions 42 of the gates. If the pins are in release position (Fig. 7) all rollers are filled for 100%. The moment an empty space is to be created, the pins are displaced among the eggs to the stop position (Fig. 8). The rollers carry on rotating, so that the result is an empty space on the rollers. Opening and closing of the pins is timed in conjunction with the start and stop moment of the rollers.

**[0025]** 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 embodiment shown in the drawings. The invention also extends to all embodiments deviating from the embodiment shown in the drawings within the scope defined by the claims.

## Claims

1. Packing system for filling egg trays, comprising feeding means (5) for feeding eggs (7), as well as a plurality of spaced, adjacent partitions (9) located directly above the feeding means and/or seen in the direction of feed located directly behind the feeding means, which partitions extend in the direction of

feed and form the side walls of gates (11) that lead to transport means (13) for further transport of the eggs, and where each gate is bounded by two unique partitions i.e. a left hand partition (9a) and a right hand partition (9b), so that two partitions are located between two adjacent gates of which one partition forms a boundary for the one gate and the other partition forms a boundary for the other gate, **characterized in that** the partitions (9) can be displaced in a direction (14) at right angles to the partitions and the packing system (1) comprises adapting means (17) for displacing the partitions, where the two partitions (9a, 9b) bounding a gate (11) can be displaced towards each other and away from each other.

2. Packing system as claimed in claim 1, **characterized in that** all left hand partitions (9a) are rigidly connected to each other and all right hand partitions (9b) are rigidly connected to each other and the adapting means (17) can simultaneously displace the partition pairs (9a, 9b) of all gates (11) towards each other and away from each other.

3. Packing system as claimed in claim 2, **characterized in that** the adapting means (17) comprise a single operating element (19) by which all partitions (9) can be adapted in a stepless manner, which operating element is located on a first arm (21) which between its ends is partly provided with teeth (23) which extend along a part of an arc of circle and are in meshing engagement with further teeth (25) which extend along a part of a further arc of circle and are present on a part of a second arm (27), where each of the arms can be rotated around the centre (24, 26) of the imaginary circle running through the respective arc of circle (24, 26), which arms are coupled with one end (21b, 27b) to a left hand or right hand partition (9a, 9b) respectively.

4. Packing system as claimed in claim 1, 2 or 3, **characterized in that** the packing system further includes shaking (29) fingers which are located ahead of the partitions and between a left hand and a right hand partition (9a, 9b) beside the gates in the direction (30) in which the eggs are fed.

5. Packing system as claimed in claim 4, **characterized in that** the shaking fingers (29) are provided with elastic or resilient contact means (31) for receiving in a resilient manner eggs (7) hitting the fingers during operation.

6. Packing system as claimed in claim 5, **characterized in that** the contact means (31) are formed by helical springs.

7. Packing system as claimed in any one of the preceding claims, characterized in that the packing sys-

tem comprises moving means (33) for moving in the direction of feed (30) of the eggs (7) at least a plurality of the shaking fingers (29) in a direction from and towards the front of the partitions (9).

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8. Packing system as claimed in any one of the preceding claims, characterized in that the packing system comprises height limiters (35) which extend transversely between the left hand and right hand partitions (9a, 9b) of a gate (11) and which are located during operation at a slight distance above the eggs (7) transported between the partitions. 10
9. Packing system as claimed in claim 8, **characterized in that** the height limiters (35) are provided with further elastic or resilient contact means for preventing eggs from rolling over one another during operation. 15
10. Packing system as claimed in claim 9, **characterized in that** the further contact means are formed by further helical springs. 20
11. Packing system as claimed in any one of the preceding claims, **characterized in that** the packing system comprises at least two vertical pins (41) which are incorporated in side partitions (42) of at least one of the gates (11) and which can be displaced by displacing means (43) towards each other and away from each other. 25 30
12. Packing system as claimed in claim 11, **characterized in that** the displacing means (43) comprise a further operating element (45) which is located at an end of a further first arm (47) which between its ends is partly provided with teeth (49) which extend along a part of an arc of circle and are in meshing engagement with further teeth (51) which extend along a part of a further arc of circle and are present on a part of a further second arm (53), where each of the further arms can be rotated around the centre (55) of the imaginary circle running through the respective arc of circle, where one of the pins (41) is present at an end of each further arm. 35 40 45

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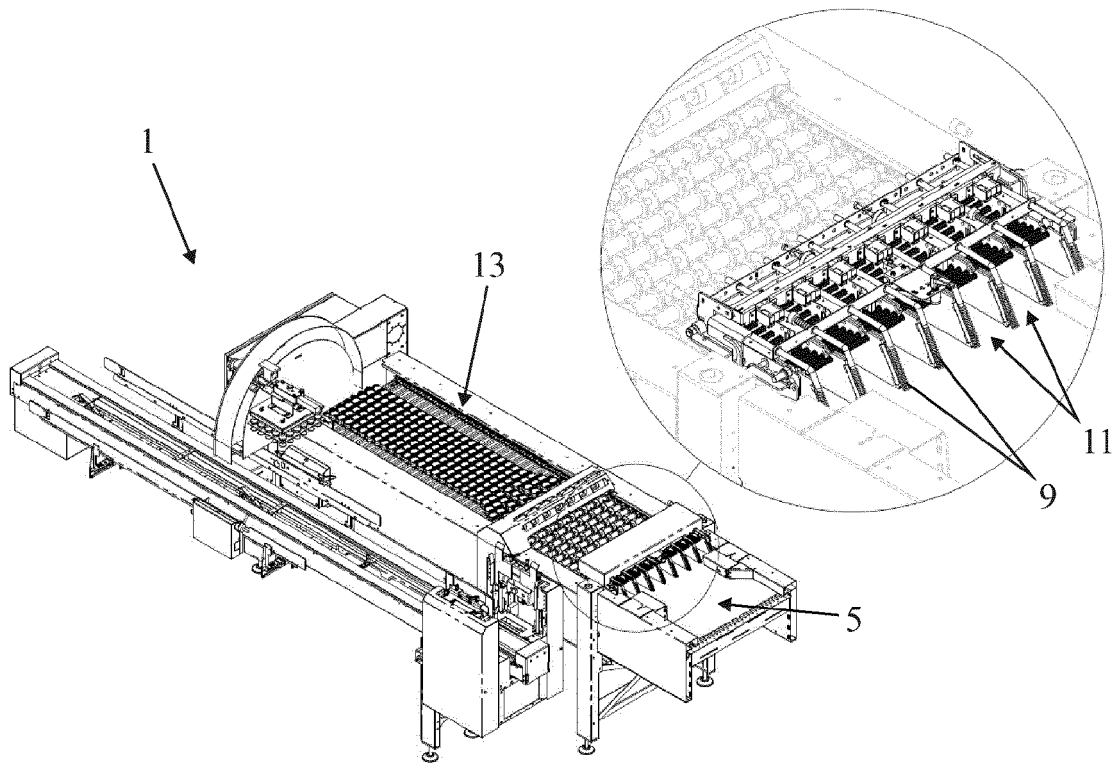


FIG. 1

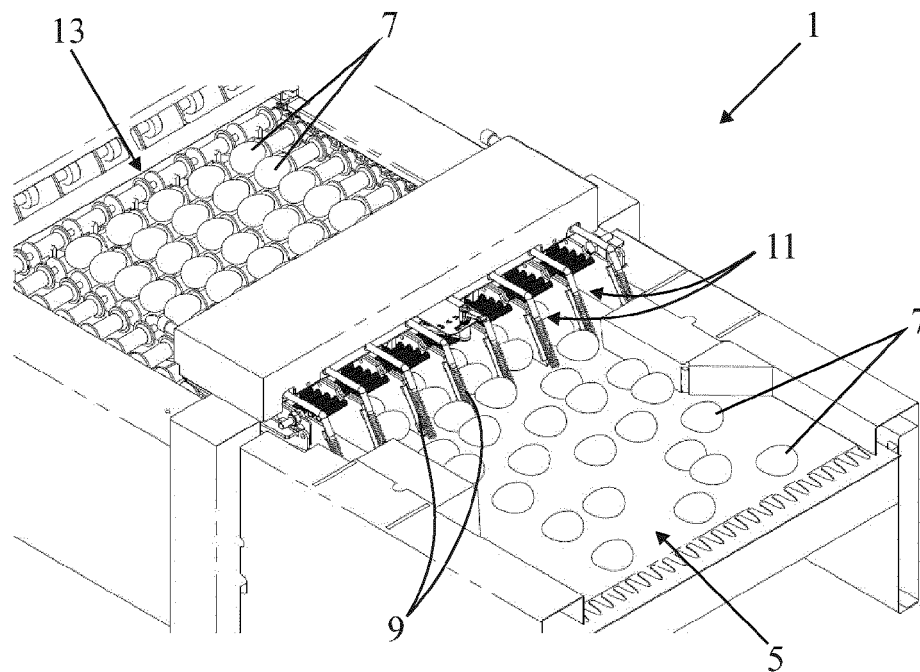


FIG. 2

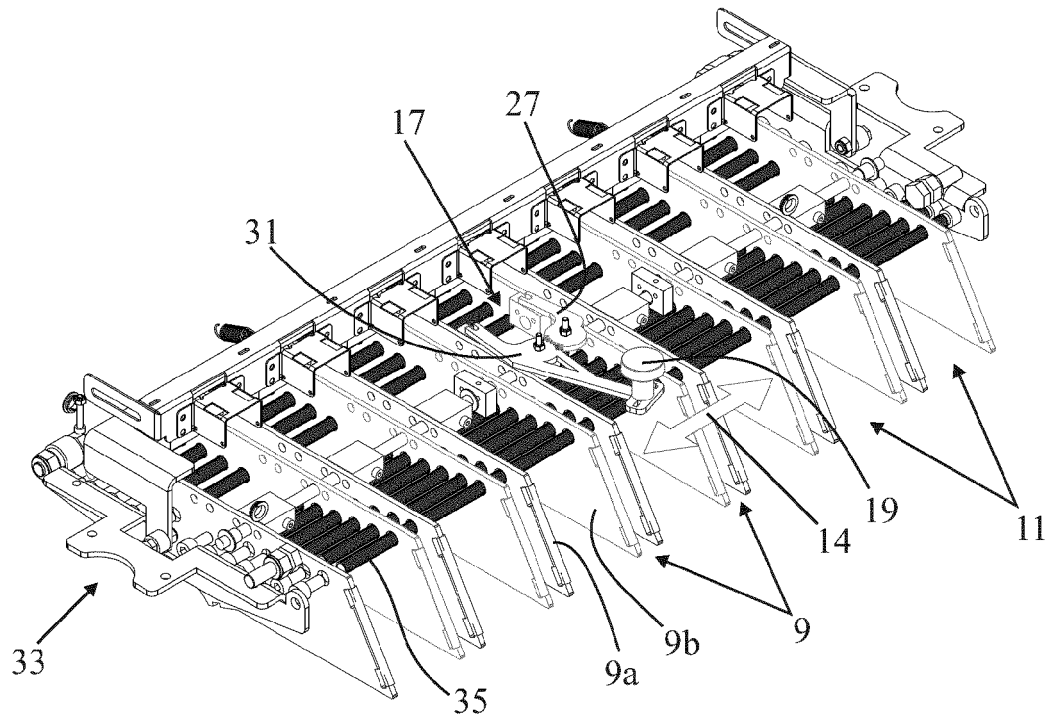


FIG. 3

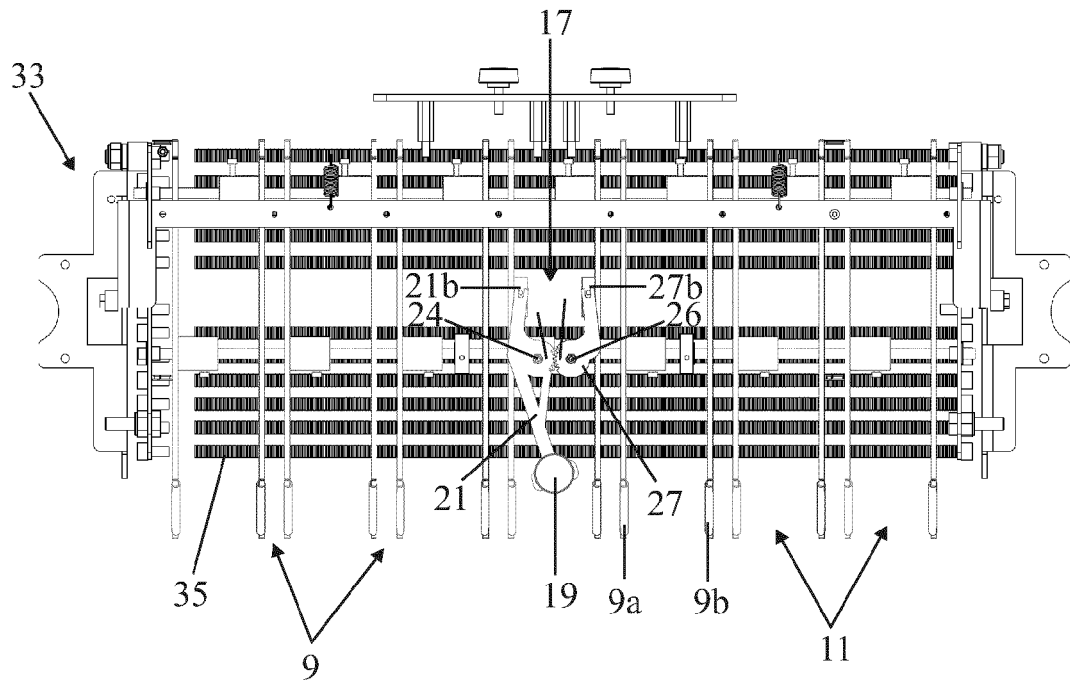


FIG. 4

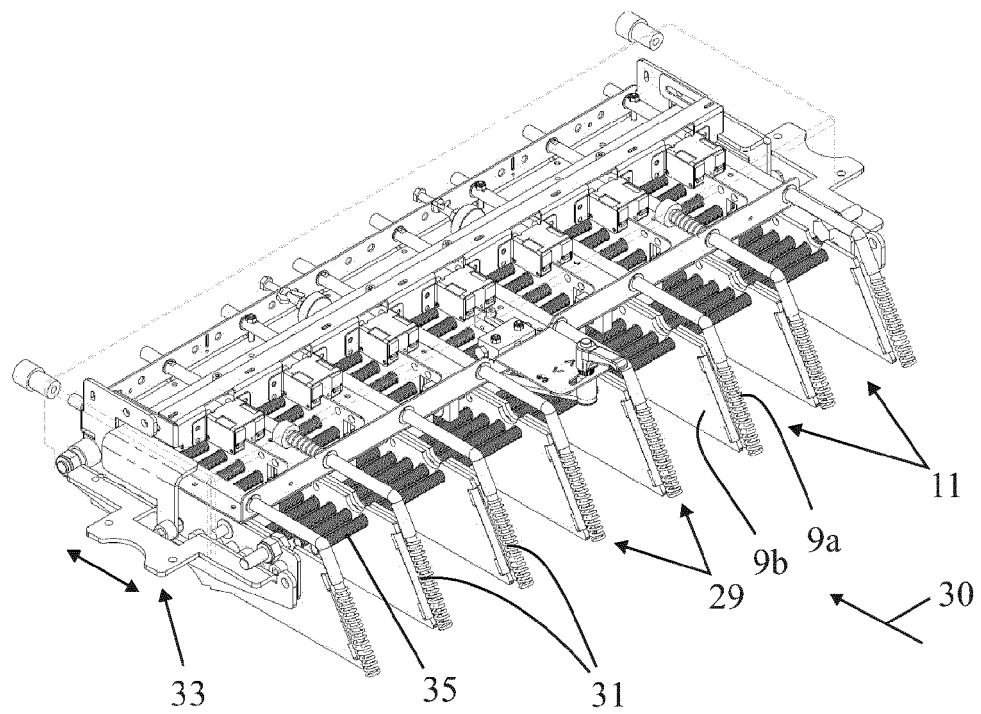


FIG. 5

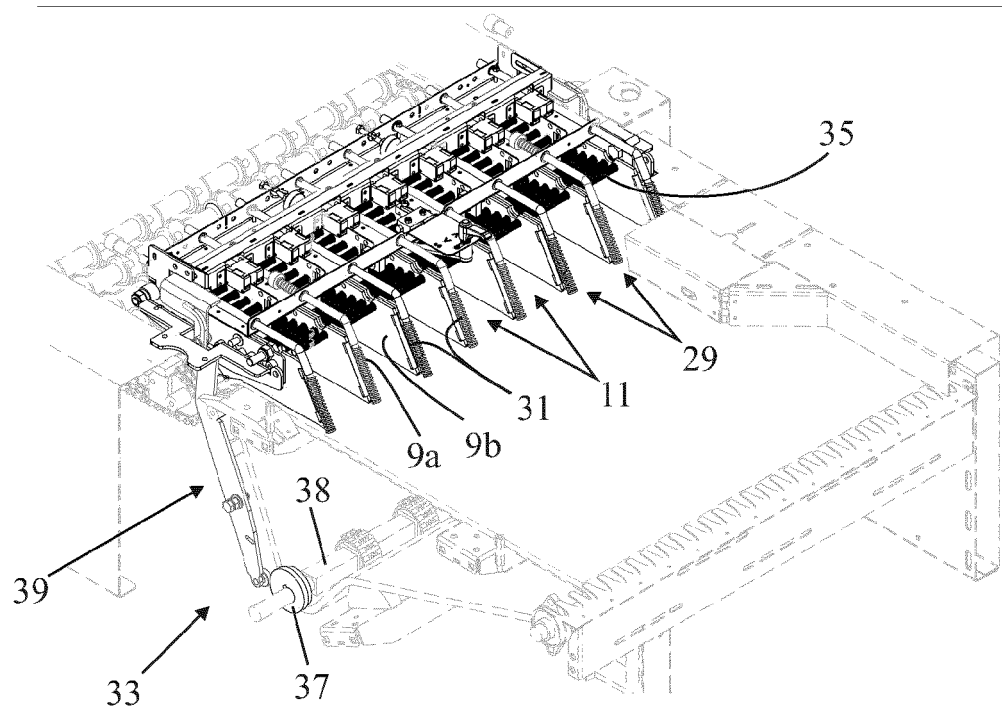


FIG. 6



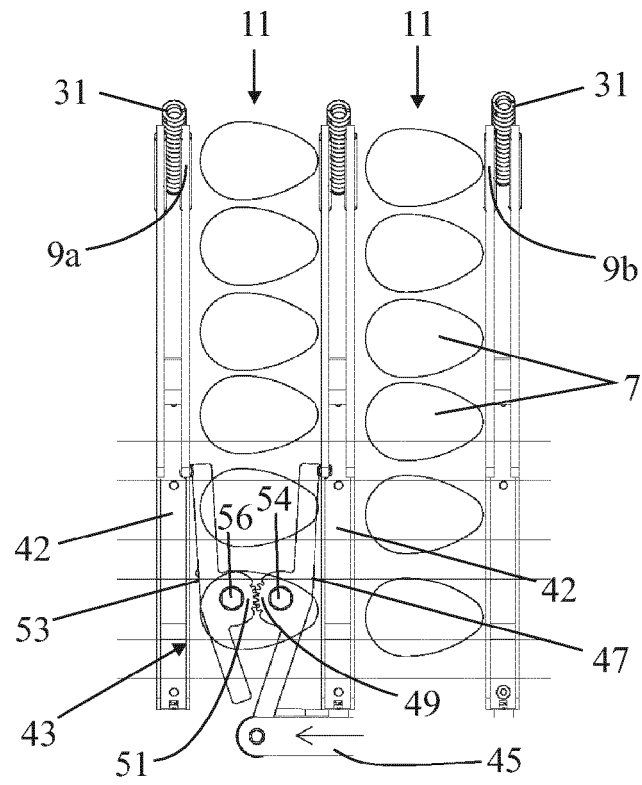


FIG. 7

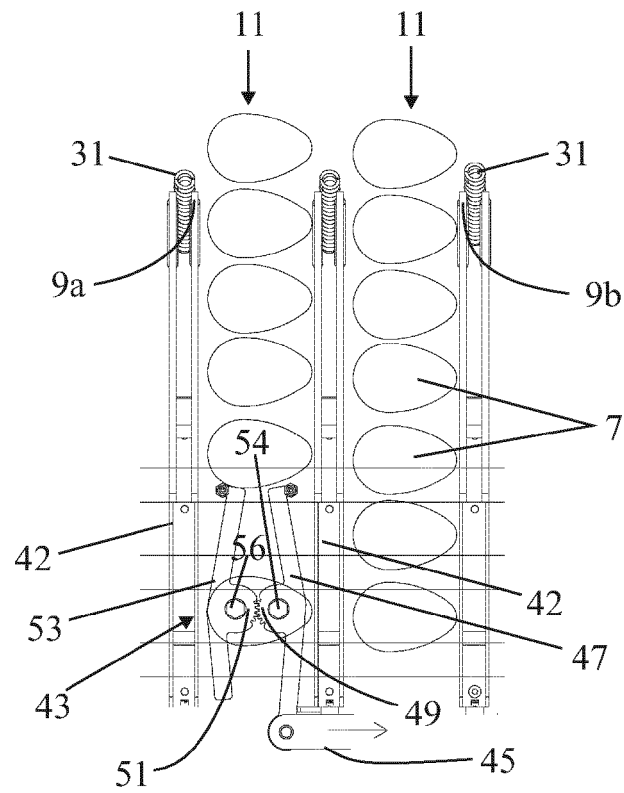


FIG. 8



## EUROPEAN SEARCH REPORT

Application Number  
EP 16 15 4538

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
			B65B A01K
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>5 July 2016</b>	Examiner <b>Lawder, M</b>
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