

Description

The present invention relates to an apparatus and method of coating a foodstuff with a particulate material.

In the preparation of frozen coated food products such as fish, meat or vegetables suitable for oven-cooking, the foodstuff is usually coated with batter, breaded, prefried, deep-frozen and then packaged. The breading material is normally a particulate material such as bread crumbs or shredded cheese, or it may be a particulate material derived from dehydrated potato, for example, potato flakes, potato powder or potato granules. The average size of the particles is generally from 0.1 to 2.0 mm diameter and the maximum volume of a particle is not usually more than about 10 cubic millimetres. The amount of breading material used in conventional procedures is normally not more than 20% by weight based on the total weight of the product.

Normally, large amounts of coating material fall off the foodstuff during the coating process and it is important that this excess coating material is reused. In conventional equipment this is normally done by elevator screws which transport the excess coating material upwards for reuse. This means that large amounts of coating material are always in circulation and exposed to the warm air of the environment which is not desirable since it is important that the coating material should be maintained at as low a temperature as possible.

From an organoleptic point of view it would be very desirable to use fresh potato particles as the coating material but up to the present time this has not been done successfully on a commercial scale. Owing to the higher water content of fresh potato when compared with dehydrated potato, the particle size has to be larger and it is not possible to obtain a satisfactory, even distribution of the particulate fresh potato material using conventional methods because in conventional equipment, the elevator screws cannot recirculate the excess particles of larger size evenly or without damaging them.

We have now developed a completely new principle for coating a foodstuff with a particulate material using an apparatus which is not only very much simpler but also enables very much smaller amounts of coating material to be in circulation at any period in time when compared with conventional apparatus. In addition, the apparatus of our invention can handle particles having a larger size than particles of the usual coating materials so that they are distributed evenly on the food product without damage.

According to the present invention there is provided an apparatus for coating a foodstuff with a particulate material characterised in that it comprises a horizontal drum capable of rotating on its longitudinal axis, two horizontal conveyors one positioned above the other adapted to travel longitudinally in opposite directions through the horizontal drum, the lower horizontal conveyor comprising three endless conveyor belts having horizontal upper runs arranged successively whereby the upper run of the second belt has an inclined portion posi-

tioned below the first belt and which travels upwards to form a horizontal portion and the gap between the second belt and the third belt is situated within the horizontal drum, means for feeding particulate material onto the upper horizontal conveyor and means for feeding the foodstuff onto the first belt of the lower horizontal conveyor so that particulate material is transferred from the upper conveyor onto the foodstuff on the first belt, excess particulate material falls off the forward end of the first belt onto the inclined portion of the second belt and is conveyed to the horizontal portion to form a layer on which the foodstuff lies after being transported from the first belt to the horizontal portion of the upper run of the second belt, and further excess particulate material falls through the gap between the second and third conveyor belts onto the lower part of the inside wall of the horizontal drum from where it travels upwards on the inside wall until it reaches a position above the upper conveyor on to which the particulate material falls by gravity.

It can be seen that, by means of the apparatus of this invention, the foodstuff may be completely coated on both sides.

The foodstuff may be any foodstuff which may be coated with particulate material, for example, vegetables, meat or fish. Before being coated the foodstuff is conveniently battered to enable the particulate material to adhere to the foodstuff. The batter may be, for instance, Tempura batter.

The particulate material may be any kind of crumb, such as bread crumbs, shredded cheese, or particulate material from dehydrated potato, for example, potato flakes, potato powder or potato granules. However, this invention is especially suitable when the particulate material is derived from fresh potato, where the individual particles have a volume from 20 to 250, preferably from 30 to 200 and especially from 40 to 150 cubic millimetres, for example, potato cubes or potato strips.

The upper horizontal conveyor is preferably a solid endless belt substantially without perforations. The fresh particulate material, together with that which has fallen by gravity from the upper inside surface of the drum is transported to the extremity of the upper horizontal conveyor where it falls off onto the foodstuff travelling on the first belt of the conveyor below. Conveniently, the upper horizontal conveyor is adapted to vibrate. When the upper horizontal conveyor is an endless belt, the vibration may conveniently be achieved by means of a triangular roller situated beneath and in contact with the upper run between the two end rollers. This enables a more even distribution of the particulate material.

Preferably, a vibrator is positioned between the upper and lower horizontal conveyors to receive the particulate material which falls off the extremity of the upper conveyor to distribute it onto the foodstuff travelling on the lower conveyor.

The first belt of the lower horizontal conveyor is advantageously perforated to enable excess batter to fall through and be collected for recirculation. If desired, additional belts may be provided which precede the first belt and these are also advanta-

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geously perforated. Any belt containing gaps or apertures is suitable but a wire mesh belt is especially preferred. The perforations should be of such a size not to allow the particulate material to pass through. The second and third belts of the lower horizontal conveyor are preferably solid belts substantially without perforations. If desired, one or more belts may be provided which succeed the third belt to carry the coated food product away.

The present invention also provides a method for coating a foodstuff with a particulate material characterised in that an upper and a lower horizontal conveyor travel longitudinally in opposite directions through a horizontal rotating drum, particulate material is fed onto an upper horizontal conveyor, foodstuff is fed onto the first belt of a lower horizontal conveyor comprising three endless conveyor belts having horizontal upper runs arranged successively whereby the upper run of the second belt has an inclined portion positioned below the first belt and which travels upwards to form a horizontal portion and the gap between the second belt and the third belt is situated within the horizontal drum, particulate material is transferred from the upper conveyor onto the foodstuff on the first belt, excess particulate material falls off the forward end of the first belt onto the inclined portion of the second belt and is conveyed to the horizontal portion to form a layer on which the foodstuff lies after being transported from the first belt to the horizontal portion of the upper run of the second belt and further excess particulate material falls through the gap between the second and third belts onto the lower part of the inside wall of the horizontal drum which rotates longitudinally carrying the particulate material upwards on the inside wall until it reaches a position above the upper conveyor on to which the particulate material falls by gravity.

The foodstuffs coated by the apparatus and method of the present invention may afterwards be prefried before being deep-frozen. They may be prepared for consumption simply by heating in an oven. The apparatus and method is especially suitable for coating a foodstuff, especially battered fresh or frozen raw fish material with dehydrated potato cubes or strips whereby the foodstuff is coated with between 10 and 70%, preferably from 15 to 50% and especially from 20 to 40% by weight of particulate material based on the total weight of the food product.

The present invention will now be further illustrated by way of example with reference to the following drawings in which:

Figure 1 is a sectional side view of the apparatus and

Figure 2 is a transverse section through the drum along the line A-A in Figure 1, and

Figure 3 is a top plan view of the upper end of a stationary plate positioned adjacent the inside wall of the drum.

Referring to the drawings, the apparatus generally designated 10 comprises a horizontal conveyor for transporting a foodstuff, consisting of a solid

belt 11, wire mesh belts 12 and 13 and solid belt 14 and 15. Beneath the upper runs of wire belts 12 and 13 are batter collectors 16 and 17 respectively. In between wire belts 12 and 13 is a spreading roller 18. The upper run of solid belt 14 has an inclined portion 19 and a horizontal portion 20. Positioned above the horizontal conveyor is a vibrator 21 having an entry opening 22 and an exit opening 23 above wire belt 12, and a pressure roller 24 positioned above the horizontal portion 20 of the upper run of solid belt 14.

Situated above the vibrator and pressure roller is a second horizontal solid endless conveyor belt 25 trained around rollers 26 and 27 and having a triangular roller 28 underneath the upper run positioned so that the angles contact the upper run as it rotates. The roller 26 is positioned directly over the entry opening 22 of the vibrator 21.

A rotating drum 29 driven by drive rollers 30, 31 is positioned so that the horizontal portion 20 of the upper run of belt 14 as well as part of belts 15 and 25 travel through it. Positioned adjacent the inside wall of the drum 29 is a stationary plate 32, the upper end of which 33 is designed to allow particulate material to be discharged evenly over the width of the belt 25. Other suitable designs of the upper end of the stationary plate will be readily apparent to a person skilled in the art.

Also illustrated in the drawings are battered frozen fish portions 34, potato cubes 35, battered frozen fish portions coated on top with potato cubes 36, battered frozen fish portions coated completely with potato cubes 37, means whereby to the upper run of the belt 25 potato cubes are continuously added 38, and arrows indicating the fall of potato cubes inside the drum 39 and 40.

In operation, the upper runs of wire mesh belts 11, 12 and 13, solid belts 14 and 15, the belt 25, the spreading roller 18 and the rotating drum 29 travel in the direction indicated by the arrows.

Battered frozen fish portions 34, each weighing 50 g are fed from a battering machine (not shown) on belt 11. Fresh potato cubes 35 having dimensions of 3 mm x 3 mm x 7 mm are fed continuously from a means 38 on to the conveyor belt 25 which vibrates by means of the rotation of the triangular roller 28. The potato cubes are transported to the end of the belt which is trained around roller 26 where they fall off and enter the vibrator 21 at the opening 22. The potato cubes leave the vibrator at the exit opening 23 and fall onto the fish portions which are lying on belt 12, to give frozen fish portions coated on top 36. Excess batter falls into the batter collectors 16 and 17 and excess potato cubes fall between belts 12 and 13 onto the inclined portion 19 of the upper run of belt 14 via the spreading roller 18. The excess potato cubes are transported on the inclined portion 19 of the upper run of solid belt 14 in the direction of the arrow to the horizontal portion 20 where the frozen fish portions coated on top travel from belt 13 to lie on the excess potato cubes so that they become completely coated fish portions 37, and pass under the pressure roller 24.

The completely coated fish portions 37 then pass through the rotating drum 29. Inside the drum ex-

cess potato cubes 35 fall between belts 14 and 15 indicated by the arrows 39 onto the lower part of the inside wall of the drum and travel upwards on the inside wall supported by the stationary plate 32, until they reach a position above the belt 25 where, indicated by the arrows 40, they fall onto the belt 25 and spread in an even manner owing to the design of the upper end 33 of the plate 32. There, they are transported, along with potato cubes fed by means 38, to be recirculated by falling off the end of the belt trained around roller 26 into the vibrator 21 and onto the battered fish portions 34.

After emerging from the inside of the rotating drum 29 on the wire belt 15, the completely coated fish portions are transported to a fryer (not shown) and then deep-frozen.

Claims

1. An apparatus for coating a foodstuff with a particulate material characterised in that it comprises a horizontal drum capable of rotating on its longitudinal axis, two horizontal conveyors one positioned above the other adapted to travel longitudinally in opposite directions through the horizontal drum, the lower horizontal conveyor comprising three endless conveyor belts having horizontal upper runs arranged successively whereby the upper run of the second belt has an inclined portion positioned below the first belt and which travels upwards to form a horizontal portion and the gap between the second belt and the third belt is situated within the horizontal drum, means for feeding particulate material onto the upper horizontal conveyor and means for feeding the foodstuff onto the first belt of the lower horizontal conveyor so that particulate material is transferred from the upper conveyor onto the foodstuff on the first belt, excess particulate material falls off the forward end of the first belt onto the inclined portion of the second belt and is conveyed to the horizontal portion to form a layer on which the foodstuff lies after being transported from the first belt to the horizontal portion of the upper run of the second belt, and further excess particulate material falls through the gap between the second and third conveyor belts onto the lower part of the inside wall of the horizontal drum from where it travels upwards on the inside wall until it reaches a position above the upper conveyor on to which the particulate material falls by gravity.

2. An apparatus according to claim 1 characterised in that the upper horizontal conveyor is a solid endless belt substantially without perforations.

3. An apparatus according to claim 1 characterised in that the upper horizontal conveyor is adapted to vibrate.

4. An apparatus according to claim 1 characterised in that a vibrator is positioned between the upper and lower horizontal conveyors to receive the particulate material which falls off the extremity of the upper conveyor to distribute it onto the foodstuff travelling on the lower conveyor below.

5. An apparatus according to claim 1 characterised in that the first belt of the lower horizontal conveyor is perforated.

6. An apparatus according to claim 1 characterised in that the second and third belts of the lower horizontal conveyor are solid belts substantially without perforations.

7. A method for coating a foodstuff with a particulate material characterised in that an upper and a lower horizontal conveyor travel longitudinally in opposite directions through a horizontal rotating drum, particulate material is fed onto an upper horizontal conveyor, foodstuff is fed onto the first belt of a lower horizontal conveyor comprising three endless conveyor belts having horizontal upper runs arranged successively whereby the upper run of the second belt has an inclined portion positioned below the first belt and which travels upwards to form a horizontal portion and the gap between the second belt and the third belt is situated within the horizontal drum, particulate material is transferred from the upper conveyor onto the foodstuff on the first belt, excess particulate material falls off the forward end of the first belt onto the inclined portion of the second belt and is conveyed to the horizontal portion to form a layer on which the foodstuff lies after being transported from the first belt to the horizontal portion of the upper run of the second belt and further excess particulate material falls through the gap between the second and third belts onto the lower part of the inside wall of the horizontal drum which rotates longitudinally carrying the particulate material upwards on the inside wall until it reaches a position above the upper conveyor on to which the particulate material falls by gravity.

8. A method according to claim 7 characterised in that the foodstuff is battered fish.

9. A method according to claim 7 characterised in that the particulate material is derived from fresh potato where the individual particles have a volume from 20 to 250 cubic millimetres.

10. A method according to claim 7 characterised in that the foodstuff is coated with from 20 to 50% by weight of particulate material based on the total weight of the food product.

Patentansprüche

1. Vorrichtung zum Beschichten von Nahrungsmitteln mit einem teilchenförmigen Material, gekennzeichnet durch eine horizontale, um ihre Längsachse drehbare Trommel, zwei Horizontalförderer, von denen einer oberhalb des anderen angeordnet ist und die in der Längsrichtung in entgegengesetzten Richtungen durch die horizontale Trommel wandern, wobei der untere Horizontalförderer drei endlose Förderbänder aufweist, deren horizontale obere Trume hintereinander angeordnet sind, wobei das obere Trum des zweiten Bandes einen geneigten Abschnitt hat, der unterhalb des ersten Bandes angeordnet ist und sich nach oben bewegt, um einen horizontalen Abschnitt zu bilden, und der Spalt zwischen dem zweiten und dem dritten Band innerhalb der horizontalen Trommel liegt, eine Einrichtung zum Zuführen von teilchenförmigem Material zum oberen Horizontalförderer und eine Einrichtung zum Zuführen der Nahrungsmittel auf das erste Band des unteren Horizontalförderers, so daß das teil-

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cess potato cubes 35 fall between belts 14 and 15 indicated by the arrows 39 onto the lower part of the inside wall of the drum and travel upwards on the inside wall supported by the stationary plate 32, until they reach a position above the belt 25 where, indicated by the arrows 40, they fall onto the belt 25 and spread in an even manner owing to the design of the upper end 33 of the plate 32. There, they are transported, along with potato cubes fed by means 38, to be recirculated by falling off the end of the belt trained around roller 26 into the vibrator 21 and onto the battered fish portions 34.

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Claims

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2. An apparatus according to claim 1 characterised in that the upper horizontal conveyor is a solid endless belt substantially without perforations.

3. An apparatus according to claim 1 characterised in that the upper horizontal conveyor is adapted to vibrate.

4. An apparatus according to claim 1 characterised in that a vibrator is positioned between the upper and lower horizontal conveyors to receive the particulate material which falls off the extremity of the upper conveyor to distribute it onto the foodstuff travelling on the lower conveyor below.

5. An apparatus according to claim 1 characterised in that the first belt of the lower horizontal conveyor is perforated.

6. An apparatus according to claim 1 characterised in that the second and third belts of the lower horizontal conveyor are solid belts substantially without perforations.

7. A method for coating a foodstuff with a particulate material characterised in that an upper and a lower horizontal conveyor travel longitudinally in opposite directions through a horizontal rotating drum, particulate material is fed onto an upper horizontal conveyor, foodstuff is fed onto the first belt of a lower horizontal conveyor comprising three endless conveyor belts having horizontal upper runs arranged successively whereby the upper run of the second belt has an inclined portion positioned below the first belt and which travels upwards to form a horizontal portion and the gap between the second belt and the third belt is situated within the horizontal drum, particulate material is transferred from the upper conveyor onto the foodstuff on the first belt, excess particulate material falls off the forward end of the first belt onto the inclined portion of the second belt and is conveyed to the horizontal portion to form a layer on which the foodstuff lies after being transported from the first belt to the horizontal portion of the upper run of the second belt and further excess particulate material falls through the gap between the second and third belts onto the lower part of the inside wall of the horizontal drum which rotates longitudinally carrying the particulate material upwards on the inside wall until it reaches a position above the upper conveyor on to which the particulate material falls by gravity.

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9. A method according to claim 7 characterised in that the particulate material is derived from fresh potato where the individual particles have a volume from 20 to 250 cubic millimetres.

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Patentansprüche

1. Vorrichtung zum Beschichten von Nahrungsmitteln mit einem teilchenförmigen Material, gekennzeichnet durch eine horizontale, um ihre Längsachse drehbare Trommel, zwei Horizontalförderer, von denen einer oberhalb des anderen angeordnet ist und die in der Längsrichtung in entgegengesetzten Richtungen durch die horizontale Trommel wandern, wobei der untere Horizontalförderer drei endlose Förderbänder aufweist, deren horizontale obere Trume hintereinander angeordnet sind, wobei das obere Trum des zweiten Bandes einen geneigten Abschnitt hat, der unterhalb des ersten Bandes angeordnet ist und sich nach oben bewegt, um einen horizontalen Abschnitt zu bilden, und der Spalt zwischen dem zweiten und dem dritten Band innerhalb der horizontalen Trommel liegt, eine Einrichtung zum Zuführen von teilchenförmigem Material zum oberen Horizontalförderer und eine Einrichtung zum Zuführen der Nahrungsmittel auf das erste Band des unteren Horizontalförderers, so daß das teil-



teilchenförmige Material vom oberen Förderer auf das Nahrungsmittel am ersten Band übergeführt wird, wobei überschüssiges teilchenförmiges Material vom vorderen Ende des ersten Bandes auf den geneigten Abschnitt des zweiten Bandes fällt und zum horizontalen Abschnitt befördert wird, um eine Schicht zu bilden, auf welcher das Nahrungsmittel zu liegen kommt, nachdem es vom ersten Band auf den horizontalen Abschnitt des oberen Trumes des zweiten Bandes übergeführt worden ist, und weiteres überschüssiges teilchenförmiges Material durch den Spalt zwischen dem zweiten und dem dritten Förderband auf den unteren Teil der Innenwand der horizontalen Trommel fällt, von wo es auf der Innenwand aufwärts befördert wird, bis es eine Position oberhalb des oberen Förderers erreicht, auf welchen das teilchenförmige Material unter Schwerkraft herabfällt.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der obere Horizontalförderer ein festes endloses Band ist, das im wesentlichen perforationsfrei ist.

3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der obere Horizontalförderer in Schwingungen versetzbar ist.

4. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß zwischen dem oberen und dem unteren Horizontalförderer ein Vibrator angeordnet ist, um das teilchenförmige Material aufzunehmen, welches vom Ende des oberen Förderers herabfällt, um dieses Material auf das darunter am unteren Förderer wandernde Nahrungsmittel zu verteilen.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das erste Band des unteren Horizontalförderers perforiert ist.

6. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das zweite und das dritte Band des unteren Horizontalförderers im wesentlichen perforationsfrei sind.

7. Verfahren zum Beschichten eines Nahrungsmittels mit einem teilchenförmigen Material, dadurch gekennzeichnet, daß ein oberer und ein unterer Horizontalförderer sich in der Längsrichtung in entgegengesetzten Richtungen durch eine horizontale drehende Trommel bewegen, wobei teilchenförmiges Material auf den oberen Horizontalförderer eingebracht wird, während das Nahrungsmittel auf das erste Band des unteren Horizontalförderers eingebracht wird, der drei endlose Förderbänder aufweist, deren horizontale obere Trume hintereinander angeordnet sind, wobei das obere Trum des zweiten Bandes einen geneigten Abschnitt hat, der unterhalb des ersten Bandes angeordnet ist und aufwärts wandert, um einen horizontalen Abschnitt zu bilden, und der Spalt zwischen dem zweiten und dem dritten Band innerhalb der horizontalen Trommel liegt, daß das teilchenförmige Material vom oberen Förderer auf das Nahrungsmittel am ersten Band übergeführt wird und überschüssiges teilchenförmiges Material vom vorderen Ende des ersten Bandes auf den geneigten Abschnitt des zweiten Bandes fällt und zum horizontalen Abschnitt befördert wird, um eine Schicht zu bilden, auf welcher das Nahrungsmittel zu liegen kommt, nachdem es

von dem ersten Band auf den horizontalen Abschnitt des oberen Trumes des zweiten Bandes übergeführt worden ist, und daß weiteres überschüssiges teilchenförmiges Material durch den Spalt zwischen dem zweiten und dem dritten Band auf den unteren Teil der Innenwand der horizontalen Trommel fällt, die um die Längsrichtung rotiert und das teilchenförmige Material auf der Innenwand nach oben befördert, bis es eine Position oberhalb des oberen Förderers erreicht, auf welchen das teilchenförmige Material durch Schwerkraft herabfällt.

8. Verfahren nach Anspruch 17, dadurch gekennzeichnet, daß das Nahrungsmittel mit aufgeschlagenem Teig versehener Fisch ist.

9. Verfahren nach Anspruch 7, dadurch gekennzeichnet, daß das teilchenförmige Material von frischen Kartoffeln erhalten wird, wobei die einzelnen Teilchen ein Volumen von 20 bis 250 mm³ haben.

10. Verfahren nach Anspruch 7, dadurch gekennzeichnet, daß das Nahrungsmittel mit 20 bis 50 Gew.-% des teilchenförmigen Materials beschichtet wird, bezogen auf das Gesamtgewicht des Nahrungsmittels.

Revendications

1. Appareil pour enrober un produit alimentaire avec une matière en particules, caractérisé en ce qu'il comporte un tambour horizontal pouvant tourner sur son axe longitudinal, deux transporteurs horizontaux placés l'un au-dessus de l'autre et conçus pour se déplacer longitudinalement dans des sens opposés à travers le tambour horizontal, le transporteur horizontal inférieur comprenant trois bandes transporteuses sans fin ayant des brins supérieurs horizontaux disposés les uns à la suite des autres de manière que le brin supérieur de la deuxième bande comporte un tronçon incliné placé au-dessous de la première bande et se déplaçant vers le haut pour former un tronçon horizontal et que l'intervalle entre la deuxième bande et la troisième bande soit situé à l'intérieur du tambour horizontal, des moyens destinés à amener la matière en particules sur le transporteur horizontal supérieur et des moyens destinés à amener le produit alimentaire sur la première bande du transporteur horizontal inférieur de manière que la matière en particules soit transférée du transporteur supérieur sur le produit alimentaire se trouvant sur la première bande, que l'excédent de matière en particules tombe de l'extrémité avant de la première bande sur le tronçon incliné de la deuxième bande et soit transporté vers le tronçon horizontal pour former une couche sur laquelle le produit alimentaire s'étend après avoir été transporté de la première bande sur le tronçon horizontal du brin supérieur de la deuxième bande, et que, en outre, l'excédent de matière en particules tombe par l'intervalle entre les deuxième et troisième bandes transporteuses sur la partie inférieure de la paroi intérieure du tambour horizontal d'où il remonte sur la paroi intérieure jusqu'à ce qu'il atteigne une position située au-dessus du transporteur supérieur sur lequel la matière en particules tombe par gravité.



Appareil selon la revendication 1, caractérisé en ce que le transporteur horizontal supérieur est une bande sans fin pleine sensiblement sans perforations.

3. Appareil selon la revendication 1, caractérisé en ce que le transporteur horizontal supérieur est conçu pour vibrer.

4. Appareil selon la revendication 1, caractérisé en ce qu'un vibreur est placé entre les transporteurs horizontaux supérieur et inférieur afin de recevoir la matière en particules qui tombe de l'extrémité du transporteur supérieur pour la distribuer sur le produit alimentaire se déplaçant sur le transporteur inférieur, au-dessous.

5. Appareil selon la revendication 1, caractérisé en ce que la première bande du transporteur horizontal inférieur est perforée.

6. Appareil selon la revendication 1, caractérisé en ce que les deuxième et troisième bandes du transporteur horizontal inférieur sont des bandes pleines, sensiblement sans perforations.

7. Procédé pour enrober un produit alimentaire avec une matière en particules, caractérisé en ce que des transporteurs horizontaux supérieur et inférieur se déplacent longitudinalement dans des sens opposés à travers un tambour tournant horizontal, une matière en particules est amenée sur un transporteur horizontal supérieur, un produit alimentaire est amené sur la première bande d'un transporteur horizontal inférieur comprenant trois bandes transporteuses sans fin ayant des brins supérieur horizontaux disposés les uns à la suite des autres, de manière que le brin supérieur de la deuxième bande comporte un tronçon incliné placé au-dessous de la première bande et qui se déplace vers le haut pour former un tronçon horizontal, et que l'intervalle entre la deuxième bande et la troisième bande soit situé à l'intérieur du tambour horizontal, une matière en particules est transférée du transporteur supérieur sur le produit alimentaire placé sur la première bande, l'excédent de matière en particules tombe de l'extrémité avant de la première bande sur le tronçon incliné de la deuxième bande et est transporté vers le tronçon horizontal pour former une couche sur laquelle le produit alimentaire s'étend après avoir été transporté de la première bande sur le tronçon horizontal du brin supérieur de la deuxième bande et, en outre, l'excédent de matière en particules tombe par l'intervalle entre les deuxième et troisième bandes sur la partie inférieure de la paroi intérieure du tambour horizontal tournant longitudinalement, entraînant la matière en particules vers le haut sur la paroi intérieure jusqu'à ce qu'elle atteigne une position située au-dessus du transporteur supérieur sur lequel la matière en particules tombe par gravité.

8. Procédé selon la revendication 7, caractérisé en ce que le produit alimentaire est du poisson revêtu de pâte.

9. Procédé selon la revendication 7, caractérisé en ce que la matière en particules provient de pomme de terre fraîche, les particules individuelles ayant un volume compris entre 20 et 250 mm³.

10 Procédé selon la revendication 7, caractérisé

en ce que le produit alimentaire est enrobé avec 20 à 50% en poids de matière en particules sur la base du poids total du produit alimentaire.

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