Embodiments of the invention have the object of providing a method for applying a coating layer to a cellulose packaging material for the purpose of setting a moisture vapour permeability of the packaging material with an increased controllability. It is a second object of the invention to provide a coating layer application device with increased controllability.

According to a first aspect, the invention relates for this purpose to a method for applying a coating layer to a cellulose packaging material for the purpose of setting a moisture vapour permeability of the packaging material, comprising:

- providing a cellulose layer with a first side and a second side;
- providing a moving endless surface comprising a grid zone with a plurality of recesses;
- taking up a predetermined quantity of coating layer material in the plurality of recesses of the grid zone;
- retaining the predetermined quantity of coating layer material in the plurality of recesses;
- bringing the grid zone into contact with the first side of the cellulose layer;
- pressing the first side of the cellulose layer against the grid zone of the moving endless surface by means of a pressing cylinder;
- interrupting application of the predetermined quantity of coating layer material to the first side of the cellulose layer by interrupting bringing the grid zone into contact with the first side of the cellulose layer, wherein interrupting application of the predetermined quantity of coating layer material to the first side of the cellulose layer is performed using a hopper mechanism which couples the pressing cylinder movably to a camshaft which is configured to convert a rotating movement thereof into an up and downward movement of the hopper mechanism, whereby the contact between the cellulose layer and the moving endless surface is interrupted;
- applying the predetermined quantity of coating layer material to the first side of the cellulose layer from the plurality of recesses; and
- forming a coating layer on the first side of the cellulose layer with the predetermined quantity of coating layer material.

Because the plurality of recesses of the grid zone take up a predetermined quantity of coating layer material, for instance by a capillary action of the recesses, then retain this quantity of coating layer material and apply it to the cellulose layer, the quantity of coating layer material which is applied to the cellulose layer is always known. The quantity of coating layer material is moreover predeterminable. This is possible by changing a size of the recesses of the grid zone. This also means that the quantity of coating layer material can therefore always be changed beforehand and is thus controllable. Furthermore, the moisture vapour permeability of the packaging material is hereby also controllable in optimal manner.

The grid zone preferably comprises a first grid zone part and a second grid zone part comprising respectively a plurality of first recesses and a plurality of second recesses which take up, retain and apply respectively a first predetermined quantity of coating layer material and a second predetermined quantity of coating layer material, wherein the first predetermined quantity of coating layer material differs from the second predetermined quantity of coating layer material. Cellulose packaging materials are used in all manner of forms and applications. After forming the coating layer on the cellulose packaging materials these packaging materials are typically formed depending on the application of the cellulose packaging material. A bread bag can thus for instance be formed by folding the cellulose packaging material and then adhering it to corresponding sides.

- retain the predetermined quantity of coating layer material in the plurality of recesses;
- wherein the moving endless surface is placeable in the vicinity of/in contact with the first side of the cellulose layer and is further configured to:
- apply the predetermined quantity of coating layer material to the first side of the cellulose layer from the plurality of recesses; and
- form a coating layer on the first side of the cellulose layer with the predetermined quantity of coating layer material.

The coating laying application device further comprising a pressing cylinder configured to press the cellulose layer against the surface of the moving endless surface in order to realize a contact between the cellulose layer and the grid zone; and a hopper mechanism which couples the pressing cylinder movably to a camshaft which is configured to convert a rotating movement thereof into an up and downward movement of the hopper mechanism, whereby the contact between the cellulose layer and the grid zone is interrupted.

The skilled person will appreciate that similar advantages and objectives apply to the method and to the corresponding coating layer application device, *mutatis mutandis*.

The grid zone preferably comprises a first grid zone part and a second grid zone part comprising respectively a plurality of first recesses and a plurality of second recesses which take up, retain and apply respectively a first predetermined quantity of coating layer material and a second predetermined quantity of coating layer material, wherein the first predetermined quantity of coating layer material differs from the second predetermined quantity of coating layer material.

The coating layer application device is preferably configured to interrupt the application of the coating layer as seen in a direction transversely of the direction of movement of the cellulose layer.

The moving endless surface is preferably further provided with a blank zone which applies no coating layer material to the first side of the cellulose layer.

A dimension of the recesses is preferably such that the coating layer has a weight lying in the range of 10-12 g/m^2, more preferably lying in the range of 8-10 g/m^2, most preferably lying in the range of 1-8 g/m^2.

The coating layer application device preferably comprises a pressing cylinder configured to press the cellulose layer against the surface of the moving endless surface in order to realize a contact between the cellulose layer and the grid zone.

The coating layer application device is preferably configured here to interrupt the contact between the cellulose layer and the grid roller.

The coating layer application device preferably comprises a hopper mechanism which couples the pressing cylinder movably to a camshaft which is configured to convert a rotating movement

thereof into an up and downward movement of the hopper mechanism, whereby the contact between the cellulose layer and the grid roller is interrupted.

The coating layer preferably comprises an oily compound, such as a paraffin or vegetable oil.

The coating layer is preferably applied in a pattern.

The plurality of recesses preferably take up the coating layer material in capillary manner.

The cellulose packaging material is preferably a bread packaging material for bread bags.

The moving endless surface is preferably a grid roller.

The coating layer preferably has a water vapour permeability lying between 15 and 200 $g/m^2/day$, preferably between 15 and 180 $g/m^2/day$, more preferably between 15 and 150 $g/m^2/day$, still more preferably between 15 and 120 $g/m^2/day$.

The coating layer application device preferably comprises a coating layer material compartment comprising a volume of coating layer material, wherein the grid roller is partially submerged in the volume of coating layer material.

The coating layer application device preferably comprises a further moving endless surface comprising a grid zone with a plurality of recesses which are configured to: take up a predetermined quantity of coating layer material in the plurality of recesses of the grid zone of the further moving endless surface; retain the predetermined quantity of coating layer material in the plurality of recesses of the further moving endless surface; wherein the further moving endless surface is placeable close to the second side of the cellulose layer (10) and is further configured to: apply the predetermined quantity of coating layer material to the second side of the cellulose layer (10) from the plurality of recesses; and form a further coating layer on the second side of the cellulose layer (10) with the predetermined quantity of coating layer material.

According to a third aspect, the invention provides a grid roller for use in the method as described above, optionally in a device as described above, comprising a surface which is provided at least partially with a grid zone and a blank zone, the grid zone comprising a plurality of recesses which are configured to take up a respective predetermined quantity of coating layer material and then

apply the coating layer material to a cellulose layer, wherein the blank zone applies no coating layer material to the cellulose layer.

According to a fourth aspect, the invention provides a cellulose packaging material wherein a coating layer for setting a moisture vapour permeability of the packaging material is applied according to the above described method, wherein the cellulose packaging material comprises a zone where no coating layer material is present, preferably with a device as described above.

According to a fifth aspect, the invention provides a cellulose packaging for foods, such as bread, baked goods, vegetables, fruit, cheese, meat, fish or non-foods, wherein the cellulose packaging is manufactured from a cellulose packaging material as described above.

Brief description of the figures

The above and other advantageous features and objectives of the invention will become more apparent and the invention better understood with reference to the following detailed description when read in combination with the accompanying drawings, in which:

Figure 1 is a perspective view of a moving endless surface with a grid zone according to an embodiment;

Figure 2 is a perspective view of the moving endless surface of figure 1 and a pressing cylinder;

Figure 3 is a schematic representation of a grid zone with a first and a second grid zone part and a cellulose layer with a corresponding coating layer according to an exemplary embodiment;

Figure 4 is a perspective view of a hopper mechanism according to an embodiment;

Figure 5 is a schematic representation of a grid zone with a first and a second grid zone part and a cellulose layer with a corresponding coating layer according to a further exemplary embodiment;

Figure 6A is a schematic representation of a method for applying a coating layer according to a preferred embodiment;

Figure 6B is a side view of a cross-section of a coating layer application device according to a preferred embodiment;

Figures 7A1, 7A2, 7B1 and 7B2 illustrate a perspective view of a cellulose packaging manufactured from a cellulose packaging material with a coating layer applied according to the method shown in figure 6A and/or using the device shown in figure 6B.

Detailed embodiments

The invention will now be further described on the basis of an exemplary embodiment shown in the drawing.

The same or similar elements are designated in the drawings with the same reference numerals.

Claims

1. Method for applying a coating layer to a cellulose packaging material for the purpose of setting a moisture vapour permeability of the packaging material, comprising:

providing a cellulose layer with a first side and a second side;

providing a moving endless surface which comprises a grid zone with a plurality of recesses;

taking up a predetermined quantity of coating layer material in the plurality of recesses of the grid zone;

retaining the predetermined quantity of coating layer material in the plurality of recesses;

bringing the grid zone into contact with the first side of the cellulose layer;

pressing the first side of the cellulose layer against the grid zone of the moving endless surface by means of a pressing cylinder;

interrupting application of the predetermined quantity of coating layer material to the first side of the cellulose layer by interrupting bringing the grid zone into contact with the first side of the cellulose layer, wherein interrupting application of the predetermined quantity of coating layer material to the first side of the cellulose layer is performed using a hopper mechanism which couples the pressing cylinder movably to a camshaft which is configured to convert a rotating movement thereof into an up and downward movement of the hopper mechanism, whereby the contact between the cellulose layer and the moving endless surface is interrupted;

applying the predetermined quantity of coating layer material to the first side of the cellulose layer from the plurality of recesses; and

forming a coating layer on the first side of the cellulose layer with the predetermined quantity of coating layer material.

2. Method according to the foregoing claim, wherein the grid zone comprises a first grid zone part and a second grid zone part comprising respectively a plurality of first recesses and a plurality of second recesses which take up, retain and apply respectively a first predetermined quantity of coating layer material and a second predetermined quantity of coating layer material, wherein the first predetermined quantity of coating layer material differs from the second predetermined quantity of coating layer material.

3. Method according to any one of the foregoing claims, wherein the moving endless surface is further provided with a blank zone which applies no coating layer material to the first side of the cellulose layer.

4. Method according to any one of the foregoing claims, wherein a dimension of the plurality of recesses is such that the coating layer has a weight lying in the range of 10-12 g/m2.

5. Method according to any one of the foregoing claims, wherein the coating layer comprises an oily compound, such as a paraffin or vegetable oil.

6. Method according to any one of the foregoing claims, wherein the coating layer is applied in a pattern.

7. Method according to any one of the foregoing claims, wherein taking up of the predetermined quantity of coating layer material in the plurality of recesses of the grid zone comprises taking up the coating layer material in the recesses in capillary manner.

8. Method according to any one of the foregoing claims, wherein the cellulose packaging material is a bread packaging material for bread bags.

9. Method according to any one of the foregoing claims, wherein the moving endless surface is a grid roller.

10. Method according to any one of the foregoing claims, wherein the coating layer has a moisture vapour permeability lying between 15 and 200 g/m2/day, preferably between 15 and 180 g/m2/day, more preferably between 15 and 150 g/m2/day, still more preferably between 15 and 120 g/m2/day.

11. Method according to any one of the foregoing claims, further comprising:

providing a further moving endless surface which comprises a grid zone with a plurality of recesses;

taking up a predetermined quantity of coating layer material in the plurality of recesses of the grid zone of the further moving endless surface;

retaining the predetermined quantity of coating layer material in the plurality of recesses of the further moving endless surface;

bringing the grid zone into contact with the second side of the cellulose layer;

applying the predetermined quantity of coating layer material to the second side of the cellulose layer from the plurality of recesses of the further moving endless surface; and

forming a further coating layer on the second side of the cellulose layer with the predetermined quantity of coating layer material.

12. A coating layer application device for setting a moisture vapour permeability of a cellulose packaging material, comprising a moving endless surface for applying a coating layer to the cellulose packaging material, wherein the cellulose packaging material comprises a cellulose layer with a first side and a second side, wherein the cellulose layer moves through the coating layer application device in a direction of movement, wherein the moving endless surface comprises a grid zone with a plurality of recesses which are configured to:

take up a predetermined quantity of coating layer material in the plurality of recesses of the grid zone;

retain the predetermined quantity of coating layer material in the plurality of recesses;

wherein the moving endless surface is placeable close to the first side of the cellulose layer and is further configured to:

apply the predetermined quantity of coating layer material to the first side of the cellulose layer from the plurality of recesses; and

form a coating layer on the first side of the cellulose layer with the predetermined quantity of coating layer material;

further comprising a pressing cylinder configured to press the cellulose layer against the surface of the moving endless surface in order to realize a contact between the cellulose layer and the grid zone; and

a hopper mechanism which couples the pressing cylinder movably to a camshaft which is configured to convert a rotating movement thereof into an up and downward movement of the hopper mechanism, whereby the contact between the cellulose layer and the grid zone is interrupted.

13. The coating layer application device according to the foregoing claim, wherein the grid zone comprises a first grid zone part and a second grid zone part comprising respectively a plurality of first recesses and a plurality of second recesses which take up, retain and apply respectively a first predetermined quantity of coating layer material and a second predetermined quantity of coating layer material, wherein the first predetermined quantity of coating layer material differs from the second predetermined quantity of coating layer material.

14. The coating layer application device according to the foregoing claim, wherein the moving endless surface is further provided with a blank zone which applies no coating layer material to the first side of the cellulose layer.

15. The coating layer application device according to any one of the claims 12-14, wherein a dimension of the recesses is such that the coating layer has a weight lying in the range of 10-12 g/m2.

16. The coating layer application device according to any one of the claims 12-15, wherein the coating layer comprises an oily compound, such as a paraffin or vegetable oil.

17. The coating layer application device according to any one of the claims 12-16, wherein the coating layer is applied in a pattern.

18. The coating layer application device according to any one of the claims 12-17, wherein the plurality of recesses take up the coating layer material in capillary manner.

19. The coating layer application device according to any one of the claims 12-18, wherein the cellulose packaging material is a cellulose packaging material for foods, such as bread, baked goods, vegetables, fruit, cheese or meat, or non-foods.

20. The coating layer application device according to any one of the claims 12-19, wherein the moving endless surface is a grid roller.

21. The coating layer application device according to any one of the claims 12-20, wherein the coating layer has a water vapour permeability lying between 15 and 200 g/m2/day, preferably between 15 and 180 g/m2/day, more preferably between 15 and 150 g/m2/day, still more preferably between 15 and 120 g/m2/day.

22. The coating layer application device according to any one of claims 12-21, further comprising a coating layer material compartment which comprises a volume of coating layer material, wherein the grid roller is partially submerged in the volume of coating layer material.

23. The coating layer application device according to any one of the claims 12-22, further comprising a further moving endless surface which comprises a grid zone with a plurality of recesses which are configured to:

take up a predetermined quantity of coating layer material in the plurality of recesses of the grid zone of the further moving endless surface;

retain the predetermined quantity of coating layer material in the plurality of recesses of the further moving endless surface;

wherein the further moving endless surface is placeable close to the second side of the cellulose layer and is further configured to:

apply the predetermined quantity of coating layer material to the second side of the cellulose layer from the plurality of recesses; and

form a further coating layer on the second side of the cellulose layer with the predetermined quantity of coating layer material.

24. A grid roller for use in the method according to any one of the claims 1-11, optionally in a device according to any one of the claims 12-23, comprising a surface which is provided at least partially with a grid zone and a blank zone, the grid zone comprising a plurality of recesses which are configured to take up a respective predetermined quantity of coating layer material and to then apply the coating layer material to a cellulose layer, wherein the blank zone applies no coating layer material to the cellulose layer.

25. A cellulose packaging material wherein a coating layer for setting a moisture vapour permeability of the packaging material is applied according to the method according to any one of the claims 1-11, wherein the cellulose packaging material comprises a zone where no coating layer material is present, preferably with a device according to any one of the claims 12-23.

26. A cellulose packaging for foods, such as bread, baked goods, vegetables, fruit, cheese or meat, or non-foods, wherein the cellulose packaging is manufactured integrally from a cellulose packaging material according to claim 25.