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The invention relates to a roof panel or façade panel of renewable tubular natural stalks, in particular of reeds, comprising a plurality of compacted stalks which extend substantially in parallel with one another and whose ends define an upper and a lower panel margin.

- 5 Roof coverings of reeds, so-called thatched roofs, are generally known. To manufacture such a roof covering, bundles of reeds are, for example, fastened to roof battens of the roof in a manner overlapping one another such that a medium thickness of the roof covering in a range of 30 cm to 40 cm is achieved and only lower end sections of the individual stalks are exposed to weather. Apart from the material effort and/or cost required for achieving the desired thickness, such roof coverings
10 can only be applied by specially trained personnel.

A roof panel in accordance with the preamble of claim 1 is known from DE 197 10 596 A1. Building panels of renewable tubular natural stalks and methods for their manufacture are moreover described in DE 11 16 372 B and in US 1 489 678 A.

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It is the underlying object of the invention to provide the possibility of a more efficient roof covering of natural stalks.

A roof panel or façade panel having the features of claim 1 is provided to satisfy the object.

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- The roof panel or façade panel in accordance with the invention of renewable tubular natural stalks, in particular of reeds, comprises a plurality of compacted stalks which extend substantially in parallel with one another and whose ends define an upper and a lower panel margin and comprises a tying system defining the outer contour of the panel and composed of tension wires which are spaced apart
25 from one another and run around transversely to the stalks and comprising a plurality of tension clamps which extend transversely to said tension wires and through the panel and which are each coupled to oppositely disposed sections of a peripheral tension wire. In this respect, the tying system is only arranged in an upper panel section adjacent to the upper panel margin, while a lower panel section adjacent to the lower panel margin is free of tension wires and of tension clamps. The lower
30 panel section extends, viewed in the direction of the stalks, over at least a third of the length of the panel, preferably over at least half the length of the panel. The spacing between adjacent tension wires becomes larger as the distance from the upper panel margin increases and the spacing between the

upper panel margin and the nearest tension wire is smaller than a minimal spacing between adjacent tension wires.

5 The invention is based on the finding that tension clamps form leak points in a roof panel or façade panel and can promote the passage of moisture through the roof panel or façade panel. The invention therefore provides that tension wires and tension clamps are dispensed with in the lower panel section and that the danger of a passage of moisture through the roof panel or façade panel is thereby minimized. Roof panels or façade panels in accordance with the invention can consequently be arranged in an overlapping manner with a smaller degree of overlap for a roof covering, in principle
10 even such that the total lower panel section of a roof panel or façade panel is exposed to weather. A thatched roof can in this manner be covered with a substantially reduced material effort and/or cost. The roof panel or façade panel in accordance with the invention can furthermore not only be manufactured simply and inexpensively, but can also be installed without any further special knowledge. Substantially less expensive thatched roofs can therefore be implemented overall with the
15 aid of roof panels or façade panels in accordance with the invention, whereby it is more easily possible also to integrate commercial buildings in a typical landscape and to maintain the cultural landscape. The efficiency of the roof panel or façade panel is additionally increased even further in that it can be used not only for the covering of a roof, but also for the cladding of a façade.

20 Advantageous embodiments of the invention can be seen from the dependent claims, from the description and from the drawing.

To ensure a secure cohesion of the stalks and ultimately a sufficient stability of the roof panel or façade panel, the tying system advantageously comprises at least two, and preferably at least three,
25 mutually spaced apart tension wires. Four tension wires can thus also be provided, for example.

To facilitate the fastening of the roof panel to roof battens of a supporting roof frame, it is generally advantageous if the spacing between two tension wires is adapted to the spacing between two roof battens. A permanently particularly reliable fastening is additionally achieved when the fastening of
30 the roof panel to the roof battens does not take place via the tension wire closest to the upper margin, but rather by means of a second and third or fourth tension wire, viewed from the upper margin. The spacing between the second and third or, optionally, fourth tension wires should therefore preferably in particular be adapted to the spacing between two roof battens.

The tension wire furthest remote from the upper panel margin preferably extends at a spacing from the upper panel margin which amounts to $1/3$ to $1/2$ of the length of the roof panel.

- 5 The efficiency of the roof panel or façade panel is increased even further when the thickness of the panel prior to weathering is in a range of a few centimeters and amounts, for example, to 1 cm to 5 cm, preferably 2 cm to 3 cm, since the material effort and/or cost is hereby minimized.

- 10 A further subject of the invention is a roof covering having at least two roof panels of the above-described kind which are arranged in an overlapping manner such that the tying system of the respective panel disposed at the bottom is covered by the panel disposed at the top and at least a part region of the lower panel section of the panel disposed at the bottom is exposed to weather at the visible face.

- 15 Another further subject of the invention is a façade cladding having at least two façade panels of the above-described kind which are arranged in an overlapping manner such that the tying system of the respective panel disposed at the bottom is covered by the panel disposed at the top and at least a part region of the lower panel section of the panel disposed at the bottom is exposed to weather at the visible face.

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The above-named advantages are correspondingly achieved both by the roof covering and by the façade cladding.

- 25 The invention will be described in the following purely by way of example with reference to a possible embodiment and to the enclosed drawing.

Fig. 1 shows a plan view of a roof panel or façade panel of reeds in accordance with the invention; and

- 30 Fig. 2 a cross-sectional view of a roof covering in accordance with the invention.

The roof panel or façade panel shown in Fig. 1 can equally be used for the covering of a roof and for the cladding of a building façade. Since the use of the roof panel or façade panel will be explained in the following for the example of a roof covering, the roof panel or façade panel will briefly be called a roof panel 10 in the following.

The roof panel 10 comprises a plurality of reed stalks 12 which extend substantially in parallel with one another so that the roof panel 10 can also be called a reed panel. The ends of the reed stalks 12 define an upper margin 14 and a lower margin 16 of the roof panel 10, wherein the terms "upper" and "lower" refer to the installed state of the roof panel 10. The upper margin 14 and the lower margin 16 extend substantially in parallel with one another so that the roof panel 10 has a substantially rectangular basic shape in the plan view.

The reed stalks 12 are substantially of equal length in the present embodiment and terminate flush with one another. Alternatively, however, it is also conceivable to displace reed stalks 12 of substantially equal length with respect to one another and/or to use reed stalks 12 of different lengths, in particular to allow them to become shorter toward the visible face of the roof panel 10, in order to come closer to the typical thatched roof look using a roof covering having such roof panels 10.

In the present embodiment, the length of the reed stalks 12, and thus the length of the roof panel 10, overall amounts to 1 m, whereas the width of the roof panel 10 amounts to 2 m and its thickness is in a range of 2 cm to 3 cm. It is understood that the roof panel 10 can, however, also be produced with other dimensions.

The reed stalks 12 are held together in a compact bond by means of a tying system defining the outer contour of the roof panel 10. The tying system comprises three tension wires 20 which run around transversely to the stalks and a plurality of tension clamps 22 which extend transversely to said tension wires and through the roof panel 10 and which are each coupled to oppositely disposed sections of a peripheral tension wire 20.

The spacing between the tension wires 20 becomes larger as the distance from the upper margin 14 increases and the spacing between the upper margin 14 and the nearest tension wire 20 is smaller than the minimal spacing between two adjacent tension wires 20. In the present embodiment, the spacing

between the upper margin 14 and the first tension wire 20a amounts to 5 cm; the spacing between the first tension wire 20a and the second tension wire 20b amounts to 15 cm; and the spacing between the second tension wire 20b and the third tension wire 20c amounts to 30 cm, i.e. the third tension wire 20c extends at a spacing of 50 cm from the upper margin 14 and thus centrally between the upper margin 14 and the lower margin 16.

The part of the roof panel 10 which is adjacent to the upper margin 14 and in which the tying system is arranged is called an upper panel section 24 here. In contrast, the remaining part of the roof panel 10 which extends up to the lower margin 16 and which is here called a lower panel section 26 is free of tension wires 20 and of tension clamps 22; i.e. no tying of the reed stalks 12 is provided in the lower panel section 26.

Fig. 2 shows a cross-section through a roof covering 30 which is formed by a plurality of roof panels 10 which are arranged in an overlaid overlapping manner on a supporting roof frame. Roof panels 10 lying over one another therefore not only overlap in the vertical direction, but also in the horizontal direction, i.e. the abutting edges of adjacent roof panels 10 of a row are offset, for example by 1/3 of the width of a roof panel 10, in the present case, therefore by approximately 66 cm, from the abutting edges of the roof panels 10 of a row of roof panels 10 disposed thereabove or thereunder.

The supporting roof frame comprises in a manner known per se a plurality of rafters 36 which are supported on a wall 34, which extend obliquely upwardly and on which a plurality of roof battens 38 are fastened which are spaced apart from one another and which extend substantially horizontally.

A door panel 10 is attached to each door batten 38 and partly lies on the door panel 10 disposed thereunder. The fastening of a door panel 10 to its associated door batten 38 takes place in the region of the upper margin 14 of the door panel 10, and indeed in a particularly simple manner by means of hook nails (not shown) which are hammered into the roof battens 38 and which engage around the outer section of the first tension wire 20a of the roof panel 10.

The spacing between the centers of two adjacent roof battens 38 amounts to 30 cm in the embodiment shown with a width of the roof battens 38 of 6 cm; i.e. the spacing between the roof battens 38 is adapted to the spacing between two tension wires 20 of each roof panel 10, in the present embodiment

to the spacing between the second tension wire 20b and the third tension wire 20c. Each roof panel 10 therefore ideally lies on a total of four roof battens 38 and overlaps with two further roof panels 10 so that no fewer than three roof panels 10 lie over one another at any point of the roof covering 30 and a minimum thickness of the roof covering 30 of 6 cm is thus not fallen below.

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At the visible face, approximately a lower third of each roof panel 10 remains free of overlap due to the overlaying of the roof panels 10 and is thus exposed to weather. Since this lower third of the roof panel 10 exposed to weather is included in the lower panel section 26 which is free of tension wires 20 and of tension clamps 22, there is no risk of an undesired penetration of moisture and the required

10 leaktightness of the roof covering can be ensured.

To implement a sufficiently stable and visually appealing roof overhang and to maintain the minimum thickness of the roof covering of 6 cm, two shorter roof panels 10b and 10c are arranged beneath the lowest complete roof panel 10a and their lower margins 16 terminate with the lower margin 16 of the

15 lowest complete roof panel 10a. The shorter roof panels 10b and 10c are fastened to auxiliary roof battens 40 which are arranged beneath the first roof batten 38a and the second roof batten 38b respectively, viewed from the wall 34. So that the lower margins 16 of the shorter roof panels 10b and 10c terminate in alignment with the lower margin 16 of the lowest complete roof panel 10a, the

20 shorter roof panels 10b and 10c are correspondingly shortened from their lower margin 16, i.e. they have a lower panel section 26 reduced in size, while the upper panel section 24 comprising the tying system is maintained. Specifically, the shorter roof panel 10b contacting the lower side of the lowest complete roof panel 10a is shortened to a length of 85 cm and the shorter roof panel 10c disposed thereunder is shortened to a length of 50 cm.

25 An alternative embodiment of a roof panel 10 is provided with three tension wires 20 which are arranged at a spacing of 5 cm, 10 cm and 35 cm from the upper margin 14 of the roof panel 10. If the roof battens 38 have a spacing of 30 cm from one another, the roof panel 10 can thus be fastened to adjacent roof battens 38 by means of a first and third tension wire 20a, 20c. It is, however, more advantageous to use such a roof panel 10 at a roof batten spacing of 25 cm since it can be fastened to

30 the roof battens 38 by means of the second and third tension wire 20b, 20c in this case. A roof batten spacing of 25 cm is additionally favorable to the extent that a four-fold overlap of roof panels 10 lying above one another can hereby be achieved, which results in an even longer durability of the roof covering.

A further alternative embodiment of a roof panel 10 is provided with four tension wires 20 which are arranged at a spacing of 5 cm, 10 cm, 35 cm and 40 cm from the upper margin 14 of the roof panel 10. Such a roof panel 10 can be used both at a roof batten spacing of 25 cm and at a roof batten spacing of 30 cm in that it can be fastened to the roof batten 38 by means of the second tension wire 20b and selectively by means of the third or fourth tension wire 20c.

It is understood that the number of tension wires 20 and/or the spacings between them can also be selected differently depending on the application. It is, for example, conceivable to use batten spacings of 35 cm or 40 cm on the cladding of a façade and to adapt the arrangement of the tension wires 20 accordingly.

Reference numeral list

	10	roof panel
	12	reed stalk
5	14	upper margin
	16	lower margin
	20	tension wire
	22	tension clamp
	24	upper panel section
10	26	lower panel section
	30	roof covering
	34	wall
	36	rafter
	38	roof batten
15	40	auxiliary roof batten

Patentkrav

1. Tag- eller facadeplade (10) af fornyelige rørformede naturstrå, særligt af siv, bestående af et stort antal kompakterede strå (12), som strækker sig i det væsentlige parallelt med hinanden, og hvis ender definerer en øvre og en nedre pladerand (14, 16), såvel som et sammensnøringssystem, der definerer en udvendig kontur af pladen (10), bestående af barduner (20), der har en indbyrdes afstand og er omløbende på tværs af stråene (12), hvor sammensnøringssystemet udelukkende er placeret i et øvre pladeafsnit (24), der grænser op til den øvre pladerand (14), mens et nedre pladeafsnit (26), der grænser op til den nedre pladerand (16) ikke har nogen barduner (20) og spændeklemmer (22), hvor det nedre pladeafsnit (26) set i stråenes (12) retning strækker sig over i det mindste en tredjedel af pladens (10) længde, **kendetegnet ved, at** sammensnøringssystemet omfatter en flerhed af spændeklemmer (22), som forløber på tværs af bardunerne (20) og gennem pladen, og som hver især er koblet sammen med afsnit, der ligger over for hinanden, af en omløbende bardun (20), og afstanden mellem ved siden af hinanden liggende barduner (20) bliver større, når afstanden til den øvre pladerand (14) tiltager, og afstanden mellem den øvre pladerand (14) og den nærmeste bardun (20) er mindre end en minimal afstand mellem ved siden af hinanden liggende barduner (20).

2. Tag- eller facadeplade (10) ifølge krav 1, **kendetegnet ved, at** det nedre pladeafsnit (26) set i stråenes (12) retning strækker sig over i det mindste halvdelen af pladens (10) længde.

3. Tag- eller facadeplade (10) ifølge krav 1 eller 2, **kendetegnet ved, at** sammensnøringssystemet omfatter i det mindste to og fortrinsvis tre barduner (20), der har en indbyrdes afstand.

4. Tag- eller facadeplade (10) ifølge et af de foregående krav, **kendetegnet ved, at** den bardun (20), der har den største afstand til den øvre pladerand (14), forløber i en afstand til den øvre pladerand (14), der udgør mellem en tredjedel og halvdelen af pladens (10) længde.

5. Tag- eller facadeplade (10) ifølge et af de foregående krav, **kendetegnet ved, at** pladens (10) tykkelse ligger inden for et område på få centimeter og eksempelvis udgør 1 cm til 5 cm, fortrinsvis 2 cm til 3 cm.

6. Tagdækning (30) med i det mindste to tagplader (10) ifølge et af de foregående krav, der er placeret overlappende på en sådan måde, at sammensnøringssystemet til den respektive nederstliggende plade (10) er overdækket af den øverstliggende plade (10), og i det mindste et delområde af det nedre

pladeafsnit (26) af den nederstliggende plade (10) på den synlige side er udsat for vejrliget.

7. Facadebeklædning med i det mindste to facadeplader (10) ifølge et af de foregående krav, der er placeret overlappende på en sådan måde, at sammensnøringssystemet til den respektive
- 5 nederstliggende plade (10) er overdækket af den øverstliggende plade (10), og i det mindste et delområde af det nedre pladeafsnit (26) af den nederstliggende plade (10) på den synlige side er udsat for vejrliget.

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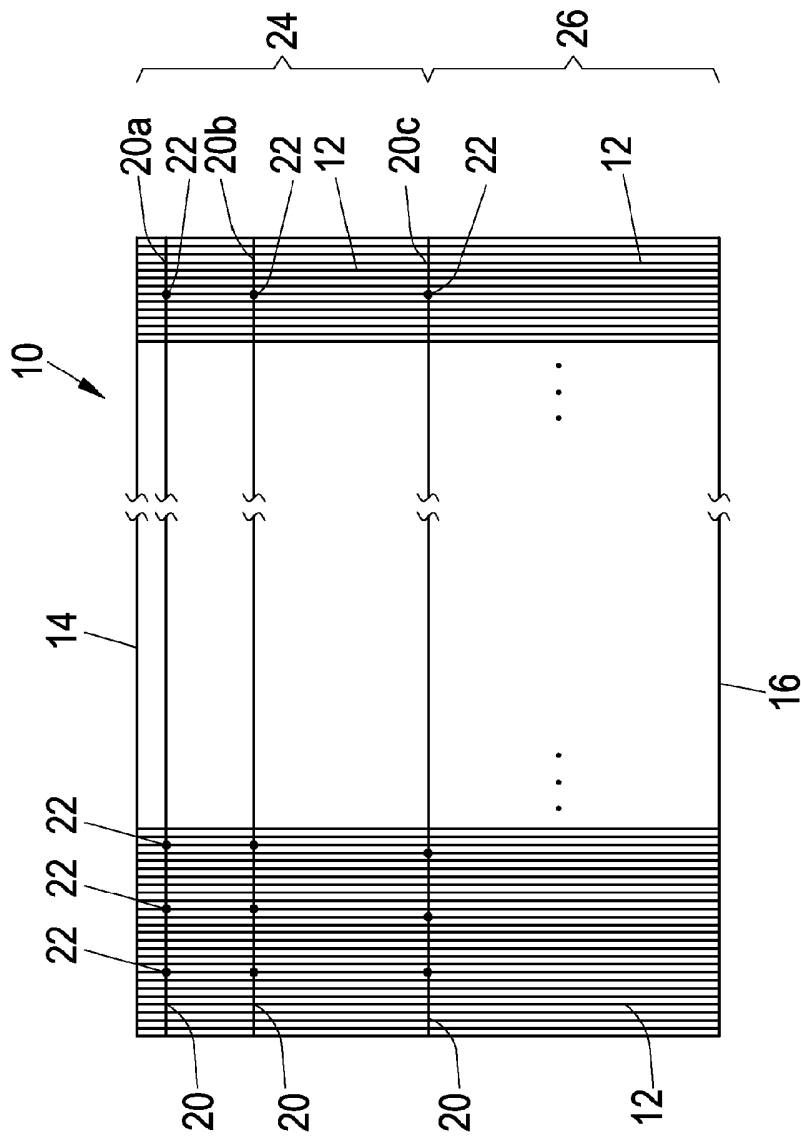


Fig. 1

