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(54) **A TRANSPORT UNIT WITH A PROTECTIVE WRAPPING FOIL AND A METHOD OF
MANIPULATING SAID WRAPPING FOIL**

TRANSPORTEINHEIT MIT EINER SCHUTZEINWICKELFOLIE UND VERFAHREN ZUR
HANDHABUNG DER EINWICKELFOLIE

UNITE DE TRANSPORT AVEC FEUILLE D'EMBALLAGE PROTECTRICE ET METHODE DE
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Description

[0001] The present invention relates to a transport unit according to the preamble of claim 1 and 4 and a method of manipulating the wrapping foil.

[0002] From EP-A-0 946 394, a transport unit is known, where a plurality of insulating panels are stacked in two or more stacks adjacent each other on mutually spaced support elements of a material suitable for use for insulation purposes. The support elements may have different orientations relative to the position of the stacks. The stacks of panels and the support elements are enclosed in a protective foil wrapping. This wrapping also provides for a stable transport unit. This transport unit is composed of insulating panels, e.g. 1000x600 mm or 2000x600 mm, length and width respectively, and it is lifted by normal lifting means, such as a lift fork. At the user's end, the panels may be cut into size before it is fitted into the building construction, e.g. a roof construction.

[0003] The fibrous material may alternatively be provided in rolls instead of stacked panels. Such rolls of insulation material are also wrapped with a wrapping foil in order to prevent the roll from unwinding and to protect the insulation material during transport.

[0004] With a protective wrapping foil surrounding most of the entire transport unit, there may be a risk of water penetrating through the uncovered foil free areas and becoming trapped in the bottom of the unit, e.g. the support element. Since the transport units often are free exposed and thereby subjected to rain, the penetration of water is always latent. Some regions of the transport unit may accumulate water, and this is a particular problem when for instance support elements of fibrous material useable for insulation purposes are used. These support elements are useless if they are soaked in water. Since in some circumstances the support elements are sold together with the rest of the transport unit, it is imperative to maintain the support elements dry to keep customers satisfied and to avoid the need for costly disposal of useless support elements of soaked fibrous material.

[0005] In this light, it is an object of the invention to provide a reliable solution to preventing the assembly of water in the support elements. Moreover, it is an object to provide a drainage, which does not critically reduce the strength of the wrapping foil and jeopardises the quality of the material in the transport unit.

[0006] These objects are obtained by a transport unit according to the invention.

[0007] The invention relates to a transport unit comprising a plurality of panels, said panels being stacked on support means, wherein the panels and the support means may be retained together by a wrapping foil surrounding them, or the transport unit comprising at least one roll of fibrous web material, in particular material for insulation purposes, wherein said roll may be stacked on support means, and wherein the at least one roll is retained together by a wrapping foil surrounding at least

the fibrous material. It is irrelevant for the purpose of the invention how the foil is wrapped around the transport unit. The foil may be used as a single sheet enveloping the panels and the support means, but may also be used as sheets enveloping the support means and the panels or stacks of panels separately.

[0008] The invention consists of a transport unit of the above-mentioned kind, wherein at least one drain aperture is provided in the lower portion of the wrapping foil or the portion in contact with the support means, or the portion where water accumulation is most likely to occur, and that the at least one aperture is provided by a treatment in the wrapping foil so that the aperture is reinforced along the rim of the apertures and if there is an overlap of layers of wrapping foil these are joined together along the rim or part of the rim of the apertures. The treatment could be heat treatment, mechanical treatment or a chemical treatment, e.g. by use of an acid solution, or a combination of one or more of these treatments in order to achieve the same result.

[0009] Hereby, a drain aperture is provided by "burning" or "etching" a relatively small hole in the plastic wrapping foil. By "burning" or etching the apertures through the layers of foil, the overlapping layers of foil may be joined together by being melted together along the rim or part of the rim. This means that the holes in the individual layers of foil cannot be displaced relative to each other, which in turn means that the drain openings are not subsequently closed and the drainage function jeopardised. By melting the apertures in the wrapping foil, a reinforced edge along the aperture or part of the aperture may be provided, which compensates for the tensile weakness, which would otherwise be occurring by providing a hole in the wrapping foil.

[0010] In a first embodiment of the invention, the panels are panels of fibrous insulating material, preferably stacked in at least one stack on support means consisting of mutually spaced support elements consisting of fibrous material suitable to be used for insulation purposes.

[0011] In a second embodiment, a roll of fibrous material is provided in the transport unit and the at least one roll is provided on support means consisting of mutually spaced support elements consisting of fibrous material suitable to be used for insulation purposes.

[0012] Preferably, the at least one aperture is provided in the portion of the wrapping foil covering the support elements. In the preferred embodiment, at least two apertures are provided in connection with each of the support elements. As mentioned above, the aperture(s) independently of how the foil is used, shall be provided in the region or regions where water accumulation (water ponding) is most likely to occur. Often this occurs in the region near the support elements or in the lower region of the stack of panels, which faces the support elements.

[0013] The invention also relates to a method of making an aperture in a wrapping foil, preferably a polymeric foil, which is surrounding a stack of panels on support means in a transport unit by advancing a heated member

into engagement with the wrapping foil and melting an aperture having a geometry corresponding to the shape of the engagement end of the tuberos member.

[0014] Alternatively, drainage may be accomplished by providing a cut or similar mechanical treatment in the foil, whereby the at least one aperture has a geometry corresponding substantially to the shape of the engagement end of the cutting means.

[0015] Drainage may also be accomplished by means of a chemical treatment in the foil, whereby the at least one aperture may acquire a random geometry but is big enough to allow for the evacuation of accumulated water.

[0016] The aperture provided by a heated member may be a generally round hole. In the method of providing this aperture, the heated member is preferably a tubular member with a generally circular or oval cross-section. The aperture could also be provided by a laser. Preferably, the at least one aperture is circular, preferably with a diameter between 0.5 to 50 mm, more preferably between 5 and 30 mm and most preferably between 15 and 25 mm. A large number of very small holes could be an alternative way of obtaining an equivalent result. Since the wrapping foil is usually wound around the fibrous material with an overlap and/or with a multiple of layers, by providing a substantially circular hole, the concentration of tensile stress around the hole it is kept low thus reducing the risk of damaging the wrapping foil.

[0017] In a preferred embodiment of the invention, the at least one aperture is a semi-annular opening leaving an uppermost connecting portion, so that a flap is provided which is connected to the wrapping foil. The semi-annular opening is preferably semi-circular, elliptical, or similar smooth partially annular shape. The opening preferably circumscribes 25-98% and more preferably 50-90% of a full circle. This type of aperture may be provided by a method wherein the heated member is provided with an end section engaging the wrapping foil, which has a generally U-shaped or semi-circular shape. By providing a semi-circular or equivalently shaped flap, i.e. by only melting away 50%-90%, e.g. 80%, of the full circle, no waste material is produced, which otherwise must be removed from the production site.

[0018] In the preferred embodiment, the wrapping foil is multi-layered. According to the method, the heated member joins together a multiple of layers of polymeric wrapping foil along the rim of the apertures in a plastic welding process. The apertures are provided by a heat welding treatment in a polymeric wrapping foil and that the layers of wrapping foil are joined together along the rim of the apertures. The equipment for carrying out the method may be a portable equipment with an extendable heating member or equipment installed in the production line subsequent to the packaging line where the transport units are built and wrapped with the foil.

[0019] The invention also relates to a method of making an aperture in a wrapping foil, which is surrounding a stack of panels on support means in a transport unit by advancing a member into engagement with the wrap-

ping foil and providing an aperture having a geometry corresponding to the shape of the engagement end of the tuberos member.

[0020] In a preferred embodiment, the member is heated to a temperature within an interval of 100°C to 200°C, preferably within 110°C to 180°C, more preferably 120°C to 160°C, most preferably approx. 135°C, and that the heated member engages the wrapping foil for a period of 0 to 30 seconds, preferably between 1 and 25 seconds, more preferably 2 to 20 seconds, most preferably approx 5 seconds. Moreover, pressure is preferably applied when the heated member engages the wrapping foil. The combination of temperature, duration and pressure is dependent on the foil material in order to achieve a satisfactory result of the method.

[0021] In the following, the invention is illustrated with reference to some most preferred embodiments shown in the accompanying drawings, in which:

- 20 Fig. 1 is a front view of a transport unit according to a first preferred embodiment of the invention;
- Fig. 2 is a side view of a transport unit according to the invention;
- 25 Figs. 3 and 4 are detailed views of two embodiments of the invention;
- Figs. 5 and 6 are principal side views of the method of making apertures in the wrapping foil; and
- 30 Fig. 7 is a front view of a transport unit according to second preferred embodiment of the invention.

[0022] In figure 1 a transport unit comprising one or more stacks of panels 1, in particular panels of insulation material is shown. The stack of panels 1 is supported on support elements 3 and wrapped in a protective wrapping foil 2, which also constitutes the retention means for retaining the panels 1 in their stacked position during transport.

[0023] The stack of panels 1 is placed on support elements 3 constituting the bottom side of the transport unit. The transport unit further has a top surface, a front and rear surfaces and two surfaces. The foil 2 is typically wrapped around the top and bottom and the side surfaces as shown in fig. 1. The wrapping foil 2 also provides the retention of the stack during transport besides protecting the fibrous insulation panels 1. The panels may be rectangular panels or wedge-shaped panels. As mentioned above, the fibrous material may alternatively be provided in rolls.

[0024] The support elements 3 are preferably made of fibrous material, which is suitable for insulation purposes. The wrapping foil 2 encompasses both the panels 1 and the support elements 3. In the section of the wrapping foil covering the support elements 3, which in the embodiment in fig. 1 includes the region of potential water accumulation, apertures 4 are provided in the vicinity of

each of the exterior corners of the support elements 3, for instance as shown in fig. 1.

[0025] In fig. 4, the transport unit is shown in a side view. As indicated in this figure, the apertures 4 are positioned adjacent the exterior longitudinal sides of the support elements.

[0026] The apertures 4 may be circular as shown in fig. 2 or semi-circular as shown in fig. 3. In order to prevent water from accumulating in the support elements in the bottom of the transport unit, an aperture having a free opening is not necessary. It can be sufficient to have a slit, as it is the case with the embodiment having semi-circular apertures 4, see fig. 3. The advantage of the aperture being a partially annular slit is that there are no blanks which are cut away from the holes and which must be removed. This makes the production of the apertures 4 easier as the need for tidying the production floor is reduced compared to making "full" holes.

[0027] As shown in figs. 5 and 6, the apertures 4 are produced by advancing a member 5, preferably a heated member, having at least a preferably heatable end section 6 towards the wrapping foil 2 at the position for the apertures 4. The heated member 5 is advanced forward to engage the wrapping foil 2, which is supported by the support element 3 immediately behind the foil 2. As the end section 6 of the heated member 5 is fully engaged with wrapping foil, the aperture is melted through the foil or foils 2. Since the fibrous insulation material behind the foil is fire resistant, there is no danger of damaging the fibrous panels in the transport unit during the aperture-making process. The heated member 5 is heated to a temperature within the range of 100°C to 200°C, in a first embodiment approx. 135°C, and the member 5 is held in engagement for approx. 5 seconds. The duration of this engagement may be from 0 to 30 seconds. This means that the member momentarily engages the wrapping foil, if this is deemed sufficient, or the member is held in engagement for a sufficient amount of time, e.g. with the application of a certain pressure. Depending on the foil material, a suitable combination of temperature, engagement time and possibly also the pressure applied is determined in order to achieve a good result of the thermal cutting action.

[0028] According to the preferred embodiment of the invention, the drain apertures are produced in the wrapping foil after the foil is wrapped around the stack of insulation panels. However, it is realised that the apertures alternatively could be produced in the wrapping foil before the foil is wrapped around the transport unit. The apertures could be produced during the manufacture of the wrapping foil or during the unwinding of the roll of wrapping foil prior to the wrapping of the transport units.

[0029] In fig. 7 is shown another embodiment of the invention, where the water accumulation region is at the bottom region of the stack of panels 1. In this embodiment, the stack of panels 1 is partially wrapped in a foil 2 and the support means 3 are separately wrapped in an additional foil 2'. The support means 3 are at the upper

surfaces of the support wrapping foils 2' adhesively attached to the wrapping foil 2. The apertures 4 are provided in the lowermost region of the "panel stack" portion of the transport unit, as this is the most likely region for water accumulation.

[0030] By the invention, it is realised that the apertures may have different shapes. Accordingly, by the term circular is meant any annularly shape having a continuous curvature. Accordingly, elliptical, oval or other equivalent shapes are considered to be comprised in the term circular, as well as multi-edged holes which in practise have the same function. Furthermore, forces in the single or multiple layer foil may stretch it and thereby change the initial shape of any aperture.

Claims

1. A transport unit comprising a plurality of panels (1) and/or rolls, said panels (1) and/or rolls being stacked on support means (3), wherein the panels (1) and the support means (3) are retained by wrapping foil (2),
characterised in that
at least one drain aperture (4) is provided in the portion of the wrapping foil (2), where water accumulation is most likely to occur, and that the at least one drain aperture (4) is provided by a treatment in the wrapping foil (2)
2. A transport unit according to claim 1, wherein the panels (1) and/or rolls are of fibrous insulating material.
3. A transport unit according to claim 2, wherein the panels (1) are stacked in at least one stack on support means (3) consisting of mutually spaced support elements consisting of fibrous material suitable to be used for insulation purposes.
4. A transport unit according to claim 3, wherein the at least one drain aperture (4) is provided in the portion of the wrapping foil (2) covering the support elements.
5. A transport unit according to claim 3 or 4, wherein at least two drain apertures (4) are provided in connection with each of the support elements.
6. A transport unit according to claim 3, wherein the at least one drain aperture (4) is provided in the portion of the wrapping foil (2) covering the lowermost section of the stack of panels (1) and/or rolls above the support elements.
7. A transport unit according to claim 3 or 6, wherein at least two drain apertures (4) are provided on at least two sides of the transport unit.

8. A transport unit according to any of the preceding claims, wherein the at least one drain aperture (4) is a generally round hole.
9. A transport unit according to any of the preceding claims, wherein the at least one drain aperture (4) is circular, preferably with a diameter of 0.5 to 50 mm, more preferably 5 to 30 mm, and most preferably 15 to 25 mm.
10. A transport unit according to any of the claims 1 to 8, wherein the at least one drain aperture (4) is a semi-annular opening leaving an uppermost connecting portion, so that a flap is provided which is connected to the wrapping foil (2).
11. A transport unit according to claim 10, wherein the semi-annular opening is semi-circular, preferably circumscribing 50-90% of a full circle.
12. A transport unit according to any of the preceding claims, wherein the wrapping foil (2) is multi-layered.
13. A transport unit according to any of the preceding claims, wherein the wrapping foil (2) is single-layered.
14. A transport unit according to any of the preceding claims, wherein the at least one drain aperture (4) is reinforced along the rim of the aperture.
15. A transport unit according to any of the preceding claims, wherein the at least one drain aperture (4) is provided in the wrapping foil (2) comprising an overlap or multiple of layers of wrapping foil (2) at the position of the drain aperture (4), by said layers being joined together along the rim of the drain aperture (4).
16. A transport unit according to claim 15, wherein the overlap or multiple of layers of wrapping foil (2) at the position of the drain aperture (4) is provided by a heat member (5).
17. A transport unit according to claim 15, wherein the heat member (5) is substantially tubular.
18. A transport unit according to claim 1, wherein the panels (1) and the support means (3) are retained together by a common wrapping foil (2).
19. A transport unit according to claim 18, wherein the transport unit is provided with additional support elements placed in between the stack of panels (1) and the support means (3).
20. A transport unit according to claim 19, wherein the additional support elements are made of a material selected from a group comprising wood, plastic or

the like.

21. A method of making a drain aperture (4) in a wrapping foil (2), which is surrounding a stack of panels (1) on support means (3) in a transport unit by advancing a member (5) into engagement with the wrapping foil (2) and providing a drain aperture (4) having a geometry corresponding to the shape of the engagement end of the tuberos member (5).
22. A method according to claim 21, whereby the member (5) is a heated tubular member (5) with a generally circular cross-section.
23. A method according to claim 21, whereby the member (5) is provided with an end section (6) engaging the wrapping foil (2), which has a generally U-shaped or semi-circular shape.
24. A method according to any of the claims 21 to 23, whereby the member (5) joins together a multiple of layers of polymeric wrapping foil (2) along the rim of the drain apertures (4) in a plastic welding process.
25. A method according to any of the claims 21 to 24, whereby the member (5), which is advanced towards the wrapping foil (2), is a heated member (5) and the drain aperture (4) is melted in the wrapping foil (2).
26. A method according to claim 25, whereby the member (5) is heated to a temperature within an interval of 100°C to 200°C, preferably within 110°C to 180°C, more preferably 120°C to 160°C, most preferably approx. 135°C, and that the heated member (5) engages the wrapping foil (2) for a period of 0 to 30 seconds, preferably between 1 and 25 seconds, more preferably 2 to 20 seconds, most preferably approx 5 seconds.
27. A method according to any of the claims 25 to 26, whereby pressure is applied when the heated member (5) engages the wrapping foil (2).
28. A method according to any of the claims 21 to 27, whereby the member (5), which is advanced towards the wrapping foil (2), applies a chemical means, such as an acid or an basic solution, for forming one or more drain apertures (4) in the wrapping foil (2).

Patentansprüche

1. Transporteinheit mit einer Mehrzahl von Platten (1) und/oder Rollen, welche Platten (1) und/oder Rollen auf Stützmitteln (3) gestapelt sind, wobei die Platten (1) und die Stützmittel (3) durch Einwickelfolie (2) festgehalten werden,
dadurch gekennzeichnet, dass

- mindestens eine Ablassöffnung (4) in dem Teil der Einwickelfolie (2) vorgesehen ist, an dem das Auftreten von Wasseransammlung am wahrscheinlichsten ist, und dass die mindestens eine Ablassöffnung (4) durch eine Behandlung in der Einwickelfolie (2) vorgesehen wird.
2. Transporteinheit nach Anspruch 1, bei der die Platten (1) und/oder Rollen aus einem Faserisoliermaterial bestehen. 10
 3. Transporteinheit nach Anspruch 2, bei der die Platten (1) in mindestens einem Stapel auf Stützmitteln (3) gestapelt sind, die aus voneinander beabstandeten Stützelementen aus Fasermaterial bestehen, welches zur Verwendung zu Isolierzwecken geeignet ist. 15
 4. Transporteinheit nach Anspruch 3, bei der die mindestens eine Ablassöffnung (4) in dem Teil der Einwickelfolie (2) vorgesehen ist, der die Stützelemente bedeckt. 20
 5. Transporteinheit nach Anspruch 3 oder 4, bei der mindestens zwei Ablassöffnungen (4) in Verbindung mit jedem der Stützelemente vorgesehen sind. 25
 6. Transporteinheit nach Anspruch 3, bei der die mindestens eine Ablassöffnung (4) in dem Teil der Einwickelfolie (2) vorgesehen ist, der den untersten Abschnitt des Stapels von Platten (1) und/oder Rollen über den Stützelementen bedeckt. 30
 7. Transporteinheit nach Anspruch 3 oder 6, bei der mindestens zwei Ablassöffnungen (4) an mindestens zwei Seiten der Transporteinheit vorgesehen sind. 35
 8. Transporteinheit nach einem der vorhergehenden Ansprüche, bei der die mindestens eine Ablassöffnung (4) ein allgemein rundes Loch ist. 40
 9. Transporteinheit nach einem der vorhergehenden Ansprüche, bei der die mindestens eine Ablassöffnung (4) kreisförmig, vorzugsweise mit einem Durchmesser von 0,5 bis 50 mm, stärker bevorzugt 5 bis 30 mm, und am stärksten bevorzugt 15 bis 25 mm ist. 45
 10. Transporteinheit nach einem der Ansprüche 1 bis 8, bei der die mindestens eine Ablassöffnung (4) eine halbringförmige Öffnung ist, die einen obersten Verbindungsteil zurücklässt, so dass eine Klappe vorgesehen ist, die mit der Einwickelfolie (2) verbunden ist. 50
 11. Transporteinheit nach Anspruch 10, bei der die halbringförmige Öffnung halbkreisförmig ist und vorzugsweise 50-90% eines vollständigen Kreises umschließt.
 12. Transporteinheit nach einem der vorhergehenden Ansprüche, bei der die Einwickelfolie (2) mehrschichtig ist.
 13. Transporteinheit nach einem der vorhergehenden Ansprüche, bei der die Einwickelfolie (2) einschichtig ist.
 14. Transporteinheit nach einem der vorhergehenden Ansprüche, bei der die mindestens eine Ablassöffnung (4) entlang dem Rand der Öffnung verstärkt ist.
 15. Transporteinheit nach einem der vorhergehenden Ansprüche, bei der die mindestens eine Ablassöffnung (4) in der Einwickelfolie (2), die eine Überlappung oder mehrere Schichten der Einwickelfolie (2) an der Position der Ablassöffnung (4) aufweist, vorgesehen wird, indem die Schichten entlang dem Rand der Ablassöffnung (4) miteinander verbunden werden.
 16. Transporteinheit nach Anspruch 15, bei der die Überlappung oder mehreren Schichten der Einwickelfolie (2) an der Position der Ablassöffnung (4) durch ein Wärmeelement (5) bereitgestellt wird.
 17. Transporteinheit nach Anspruch 15, bei der das Wärmeelement (5) im wesentlichen röhrenförmig ist.
 18. Transporteinheit nach Anspruch 1, bei der die Platten (1) und die Stützmittel (3) durch eine gemeinsame Einwickelfolie (2) zusammengehalten werden.
 19. Transporteinheit nach Anspruch 18, wobei die Transporteinheit mit zusätzlichen Stützelementen versehen ist, die zwischen dem Stapel aus Platten (1) und den Stützmitteln (3) platziert sind.
 20. Transporteinheit nach Anspruch 19, bei der die zusätzlichen Stützelemente aus einem Material hergestellt werden, dass aus der Holz, Kunststoff oder dergleichen einschließenden Gruppe ausgewählt ist.
 21. Verfahren zum Herstellen einer Ablassöffnung (4) in einer Einwickelfolie (2), die einen Stapel aus Platten (1) auf Stützmitteln (3) in einer Transporteinheit umschließt, durch Vorschieben eines Elements (5) in Eingriff mit der Einwickelfolie (2) und Vorsehen einer Ablassöffnung (4) mit einer Geometrie, die der Form des Eingriffsendes des röhrenförmigen Elements (5) entspricht.
 22. Verfahren nach Anspruch 21, bei dem das Element (5) ein erhitztes röhrenförmiges Element (5) mit ei-

nem allgemein kreisförmigen Querschnitt ist.

23. Verfahren nach Anspruch 21, bei dem das Element (5) mit einem Endabschnitt (6) versehen ist, der die Einwickelfolie (2) ergreift und eine allgemein U-förmige oder halbkreisförmige Form aufweist.
24. Verfahren nach einem der Ansprüche 21 bis 23, bei dem das Element (5) mehrere Schichten aus polymerer Einwickelfolie (2) entlang dem Rand der Ablassöffnungen (4) in einem Kunststoffschweißprozess miteinander verbindet.
25. Verfahren nach einem der Ansprüche 21 bis 24, bei dem das Element (5), das in Richtung auf die Einwickelfolie (2) vorgeschoben wird, ein erhitztes Element (5) ist und die Ablassöffnung (4) in die Einwickelfolie (2) geschmolzen wird.
26. Verfahren nach Anspruch 25, bei dem das Element (5) auf eine Temperatur innerhalb eines Intervalls von 100°C bis 200°C, vorzugsweise innerhalb von 110°C bis 180°C, stärker bevorzugt 120°C bis 160°C, am stärksten bevorzugt etwa 135°C erhitzt wird, und das erhitzte Element (5) die Einwickelfolie (2) für eine Zeitspanne von 0 bis 30 Sekunden, vorzugsweise zwischen 1 und 25 Sekunden, stärker bevorzugt 2 bis 20 Sekunden, und am stärksten bevorzugt ungefähr 5 Sekunden ergreift.
27. Verfahren nach einem der Ansprüche 25 bis 26, bei dem Druck angelegt wird, wenn das erhitzte Element (5) die Einwickelfolie (2) ergreift.
28. Verfahren nach einem der Ansprüche 21 bis 27, bei dem das Element (5), das in Richtung auf die Einwickelfolie (2) vorgeschoben wird, ein chemisches Mittel wie zum Beispiel eine Säure oder basische Lösung zum Ausbilden einer oder mehrerer Ablassöffnungen (4) in der Einwickelfolie (2) aufbringt.

Revendications

1. Unité de transport comprenant une pluralité de panneaux (1) et/ou de rouleaux, lesdits panneaux (1) et/ou rouleaux étant empilés sur un moyen de support (3), les panneaux (1) et le moyen de support (3) étant retenus par une feuille d'emballage (2) ;
caractérisée en ce que
au moins une ouverture d'évacuation (4) est ménagée dans la partie de la feuille d'emballage (2), à l'endroit où une accumulation d'eau est le plus susceptible de survenir, et **en ce que** la/les ouvertures d'évacuation (4) sont créées par un traitement dans la feuille d'emballage (2).
2. Unité de transport selon la revendication 1, dans la-

quelle les panneaux (1) et/ou rouleaux sont en matière isolante fibreuse.

3. Unité de transport selon la revendication 2, dans laquelle les panneaux (1) sont empilés en au moins une pile sur le moyen de support (3) constitué par des éléments de support espacés les uns des autres, en matière fibreuse utilisable à des fins d'isolation.
4. Unité de transport selon la revendication 3, dans laquelle la/les ouvertures d'évacuation (4) sont ménagées dans la partie de la feuille d'emballage (2) couvrant les éléments de support.
5. Unité de transport selon la revendication 3 ou 4, dans laquelle au moins deux ouvertures d'évacuation (4) sont ménagées d'une manière correspondant à chacun des éléments de support.
6. Unité de transport selon la revendication 3, dans laquelle la/les ouvertures d'évacuation (4) sont ménagées dans la partie de la feuille d'emballage couvrant la partie inférieure de la pile de panneaux (1) / ou de rouleaux au-dessus des éléments de support.
7. Unité de transport selon la revendication 3 ou 6, dans laquelle au moins deux ouvertures d'évacuation (4) sont ménagées sur au moins deux côtés de l'unité de transport.
8. Unité de transport selon l'une quelconque des revendications précédentes, dans laquelle la/les ouvertures d'évacuation (4) sont des trous globalement ronds.
9. Unité de transport selon l'une quelconque des revendications précédentes, dans laquelle la/les ouvertures d'évacuation (4) sont circulaires, de préférence avec un diamètre de 0,5 à 50 mm, de préférence encore de 5 à 30 mm et de préférence surtout de 15 à 25 mm.
10. Unité de transport selon l'une quelconque des revendications 1 à 8, dans laquelle la/les ouvertures d'évacuation (4) sont des ouvertures semi-annulaires laissant une partie supérieure de liaison, de façon qu'un rabat relié à la feuille d'emballage (2) soit présent.
11. Unité de transport selon la revendication 10, dans laquelle l'ouverture semi-annulaire est semi-circulaire, décrivant de préférence de 50 à 90 % d'un cercle entier.
12. Unité de transport selon l'une quelconque des revendications précédentes, dans laquelle la feuille d'emballage (2) comporte plusieurs couches.

13. Unité de transport selon l'une quelconque des revendications précédentes, dans laquelle la feuille d'emballage (2) est constituée d'une seule couche.
14. Unité de transport selon l'une quelconque des revendications précédentes, dans laquelle la/les ouvertures d'évacuation (4) sont renforcées sur le bord de l'ouverture. 5
15. Unité de transport selon l'une quelconque des revendications précédentes, dans laquelle la/les ouvertures d'évacuation (4) sont ménagées dans la feuille d'emballage (2) comportant un chevauchement ou une pluralité de couches de feuilles d'emballages (2) à l'emplacement de la/des ouvertures d'évacuation (4), par le fait que lesdites couches sont réunies les unes aux autres le long du bord de la/des ouvertures d'évacuation (4). 10
16. Unité de transport selon la revendication 15, dans laquelle le chevauchement ou la pluralité de couches de feuille d'emballage (2) à l'emplacement de l'ouverture d'évacuation (4) est obtenu grâce à un élément de chauffage (5). 20
17. Unité de transport selon la revendication 15, dans laquelle l'élément de chauffage (5) est sensiblement tubulaire. 25
18. Unité de transport selon la revendication 1, dans laquelle les panneaux (1) et le moyen de support (3) sont retenus les uns aux autres par une feuille d'emballage commune (2). 30
19. Unité de transport selon la revendication 18, dans laquelle l'unité de transport est pourvue d'éléments de support supplémentaires placés entre la pile de panneaux (1) et le moyen de support (3). 35
20. Unité de transport selon la revendication 19, dans laquelle les éléments de support supplémentaires sont en matière choisie dans un groupe comprenant le bois, la matière plastique ou équivalent. 40
21. Procédé de réalisation d'une ouverture d'évacuation (4) dans une feuille d'emballage (2) qui entoure une pile de panneaux (1) sur un moyen de support (3) dans une unité de transport en faisant avancer un élément (5) au contact de la feuille d'emballage (2) et en créant une ouverture d'évacuation (4) ayant une géométrie correspondant à la forme de l'extrémité d'engagement de l'élément chauffé tubulaire (5). 45 50
22. Procédé selon la revendication 21, par lequel l'élément (5) est un élément chauffé tubulaire (5) à section transversale globalement circulaire. 55
23. Procédé selon la revendication 21, par lequel l'élément (5) est pourvu d'une partie d'extrémité (6) au contact de la feuille d'emballage (2), à forme globalement en U ou en demi-cercle.
24. Procédé selon l'une quelconque des revendications 21 à 23, par lequel l'élément (5) réunit les unes aux autres une pluralité de couches de feuille d'emballage en polymère (2) le long du bord des ouvertures d'évacuation (4) au cours d'une opération de soudage de matière plastique.
25. Procédé selon l'une quelconque des revendications 21 à 24, par lequel l'élément (5) qui est avancé vers la feuille d'emballage (2) est un élément chauffé (5) et l'ouverture d'évacuation (4) est réalisée par fusion dans la feuille d'emballage (2).
26. Procédé selon la revendication 25, par lequel l'élément (5) est chauffé à une température de 100°C à 200°C, de préférence de 110°C à 180°C, de préférence encore de 120°C à 160°C, de préférence surtout d'environ 135°C, et dans lequel l'élément chauffé (5) vient au contact de la feuille d'emballage (2) pendant une durée de 0 à 30 secondes, de préférence de 1 à 25 secondes, de préférence encore de 2 à 20 secondes, de préférence surtout d'environ 5 secondes.
27. Procédé selon l'une quelconque des revendications 25 à 26, par lequel une pression est appliquée lorsque l'élément chauffé (5) vient en contact de la feuille d'emballage (2).
28. Procédé selon l'une quelconque des revendications 21 à 27, par lequel l'élément (5), qui est avancé vers la feuille d'emballage (2), applique un agent chimique tel qu'une solution acide ou basique pour former une ou plusieurs ouvertures d'évacuation (4) dans la feuille d'emballage (2).

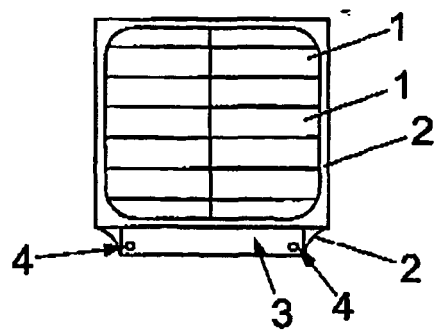


Fig. 1

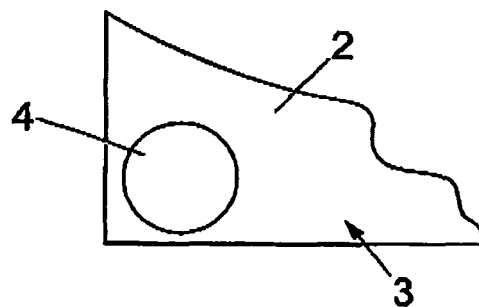


Fig. 2

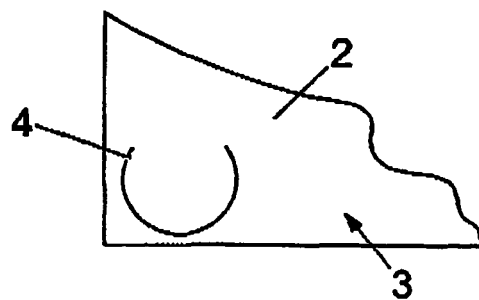


Fig. 3

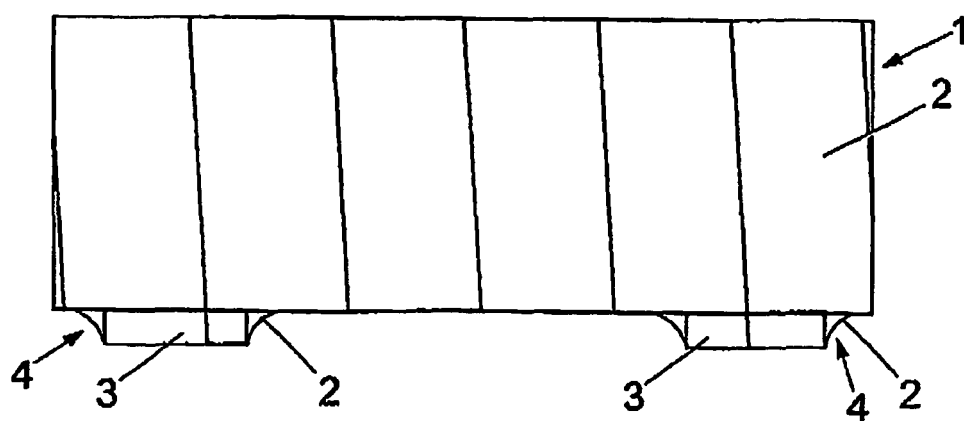


Fig. 4

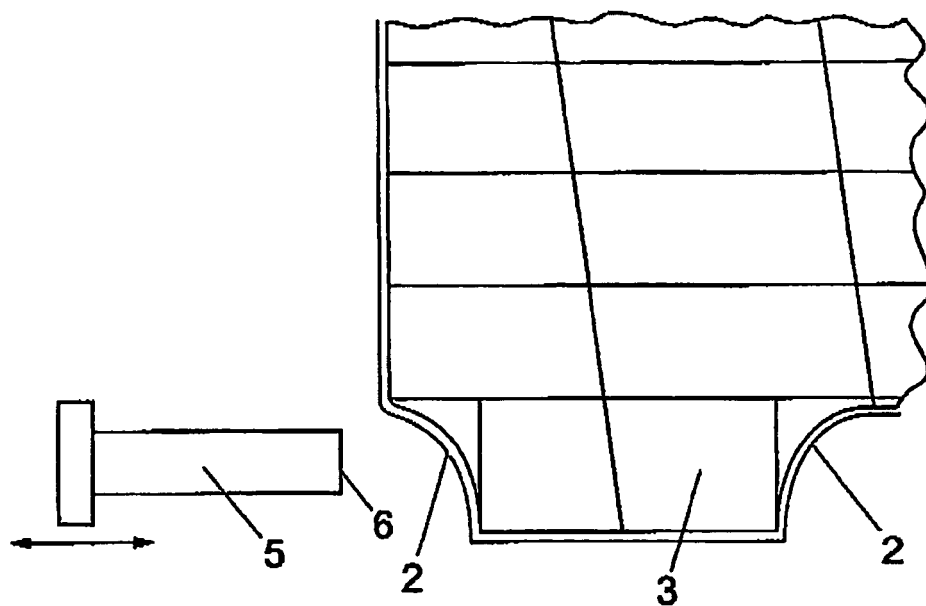


Fig. 5

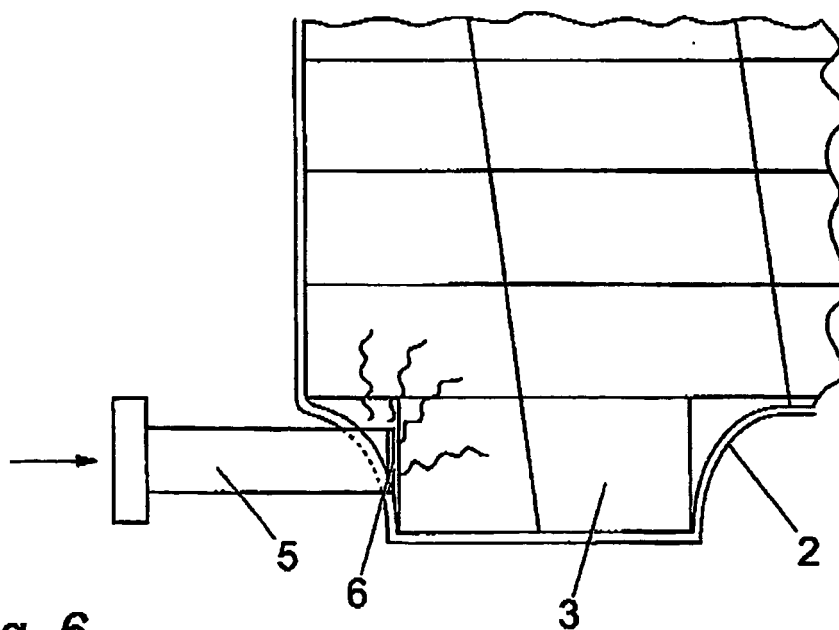


Fig. 6

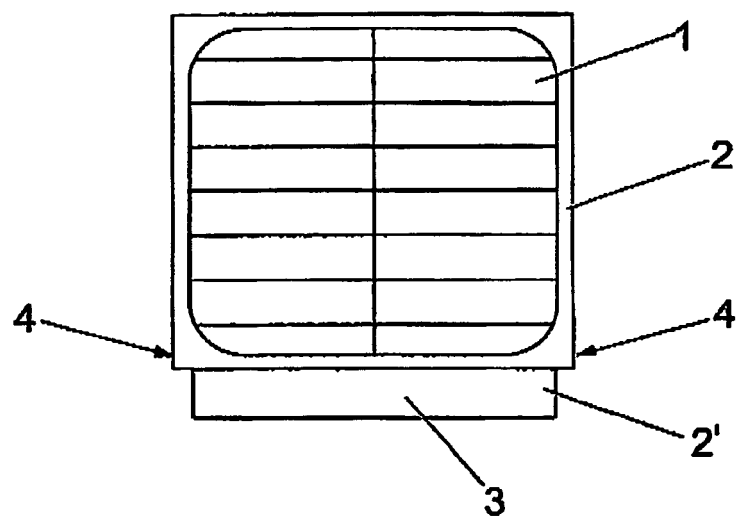


Fig. 7