Seam structure, connecting structure, method for separating a seam structure, use of a pressure boiling device for separating a seam structure

Field of the invention

The present invention relates to a seam structure, a connecting structure, a method for separating a seam structure, and the use of a pressure boiling device for separating a seam structure.

Background of the Invention

In the prior art, for example as disclosed in JP H 0 881 811A, a seam comprising a water-soluble yarn is known. This allows individual textile portions, which are joined by the seam, to be separated from one another, whilst the textile portions themselves consist of an insoluble material. A temperature for dissolution may, for example, be 70°C.

However, such yarns may not meet certain requirements during use. For instance, under certain circumstances, such yarns may dissolve as early as during the washing of a textile, or their stiffness or strength may diminish before they dissolve. To meet certain requirements using such conventional yarns, costs can rise rapidly.

It is therefore the object of the invention to provide a seam structure that allows a textile structure to be reliably separated whilst at the same time meeting high technical requirements.

Summary of the invention

This problem is solved in accordance with the invention by a seam structure according to claim 1.

According to a first aspect disclosed herein, a seam structure is provided which comprises: a first yarn which has a destructible portion; and a second yarn which, together with the first yarn, forms a seam and is formed from a material different from a material of the destructible portion. At least the destructible portion can be destroyed by pressure boiling, wherein at least the destructible portion is formed from a material which is resistant in water at a temperature below 100°C and can be destroyed by pressure boiling in water or in an aqueous solution at a temperature above 100°C.

According to the first aspect, the first yarn comprises the destructible portion, which can be destroyed by pressure boiling. Consequently, the first yarn can also withstand high temperatures during washing, for example between 30°C and 75°C, and exhibit a required stiffness/strength. Furthermore, the first yarn with the destructible portion is used only partially in the seam structure alongside the second yarn. Consequently, technical, tactile and/or visual requirements can be met via the second yarn, in particular through the choice of material for the second yarn, which differs from a material of the destructible portion, and, in particular, from any material used in the destructible portion. Furthermore, the cost-effectiveness can be increased through the only partial use of the first yarn with the destructible portion. Pressure boiling can be carried out in a straightforward manner, which in turn can enhance cost-effectiveness when separating the seam structure.

The present invention is particularly suitable for the separation of the seam structure by material type. Separation by material type can be assumed in terms of material composition if a material or a mixture of materials can be further processed in a recycling process, wherein different materials or mixtures of materials may result in different recycling processes. A recycling process may be carried out chemically and/or mechanically and/or thermally. The present invention has the advantageous effect that the high temperatures required to separate the seam structure simultaneously result in the sterilisation of the remaining material.

In other words, a hybrid seam structure is created which comprises at least two yarns, the first of which can be destroyed, at least in part, by pressure boiling.

For the purposes of definition, it should be noted that, in this disclosure, ‘pressure boiling’ refers to the immersion of the seam structure in a fluid, in particular a liquid, and more specifically water, wherein the fluid has a temperature of at least 100°C, in particular more than 100°C. Furthermore, the pressure is above atmospheric pressure. In this process, the destructible portion dissolves, and is thus chemically degraded. The fluid may, in particular, be pure water or an aqueous solution, i.e. water containing a chemical additive, such as an acid and/or a base. The chemical additive may, for example, be NaOH.

The temperature of the fluid may, for example, be at least or more than 100°C and less than or equal to 150°C. Further limit values may be 110°C, 120°C, 130°C and 140°C, wherein each of these limit values may be a lower limit or an upper limit, which may in each case be inclusive or exclusive. All sub-ranges formed from any combinations of these limits are therefore also explicitly disclosed. The destructible portion is only destroyed from or above the respective lower limit.

With regard to pressure, the pressure may exceed 1 bar and, for example, be less than 10 bar. Further limit values may be 2 bar, 3 bar, 4 bar, 5 bar, 6 bar, 7 bar, 8 bar and 9 bar, wherein each of these limit values may be a lower limit or an upper limit, which may in each case be inclusive or exclusive. All sub-ranges formed from any combinations of these limit values are thus also explicitly disclosed.

In order to carry out pressure boiling of a seam structure according to the invention, it is possible to use known mechanical pressure boiling devices which were previously designed for another application involving the treatment of textiles, for example known high-pressure dyeing machines which were designed to dye textiles using a liquid containing a dye and, for this purpose, to treat the textiles to be dyed in a pressurised liquid brought to the boil.

A seam structure herein refers to a seam comprising at least two yarns which cross one another at at least one point, in particular at a plurality of points. The seam structure can generally be described as a textile joint formed by the crossing of sewing thread stitches. In other words, the seam structure refers to a multi-thread (yarn) stitch, such as those disclosed, for example, in ISO 4915 and DIN 61400. Any of the seam structures disclosed therein comprising at least two yarns may be regarded geometrically as the seam structure of the invention. The seam structures disclosed therein are incorporated herein by reference.

In the seam structure, the first yarn may cross under the second yarn, cross over it, or alternate between crossing under and over it.

Needless to say, the seam structure may also comprise more than two yarns.

In the seam structure, the destructible portion may be present at least in the region of a crossing point of the yarns, in particular at each crossing point. This allows the crossing to be undone. Then, in a subsequent step, the remaining part of the first yarn and the second yarn can, for example, be easily separated from one another by mechanical processing, so that the seam structure can be completely separated. However, in particular, the entire first yarn is designed as the destructible portion. This makes it particularly easy to separate the seam structure without the need for further processing.

In accordance with the first aspect, the second yarn may not be destructible by pressure boiling.

This ensures that the second yarn remains substantially unchanged even after the seam structure has been separated. The second yarn can therefore be reused or recycled. The second yarn may be destructible by means other than pressure boiling.

Furthermore, the second yarn may be destructible by pressure boiling under conditions other than those required to destroy the destructible portion.

This also means that the second yarn can be reused after pressure boiling and thus after the seam structure has been separated. The other conditions may, for example, comprise a different, in particular higher, temperature, a different, in particular higher, pressure and/or a different fluid for the pressure boiling, relative to the conditions under which the destructible portion is destroyed.

Furthermore, the second yarn may have greater stiffness and/or strength than the destructible portion.

This ensures that certain technical requirements, such as stiffness and/or strength, are met by the seam structure via the second yarn, even if the first yarn is destructible, at least in portions, by pressure boiling. For example, the second yarn may be made of a material with a higher tensile strength and/or a higher modulus of elasticity than the destructible portion. The second yarn may also have a larger cross-sectional area than the maximum cross-sectional area of the destructible portion or of the entire first yarn.

In the seam structure, the second yarn may be the yarn that bears the majority of the load. In particular, the second yarn may be a needle thread, whilst the first yarn may, for example, be a bobbin or looper thread.

Furthermore, the second yarn may be surface-treated, at least in portions, in particular bleached and/or dyed.

This, too, ensures that the second yarn meets certain requirements regarding appearance and/or feel, whilst also ensuring that the seam structure can be reliably separated. The surface treatment may be a type of surface treatment distinct from mechanical processing. In particular, a desired colour may be achieved by bleaching, for example using a bleaching agent, and/or dyeing. However, the surface treatment may also involve applying a heat-insulating or fluid-repellent layer to the second yarn. This allows the second yarn to be protected during pressure boiling.

In particular, the destructible portion may be unbleached and/or undyed, at least in portions.

This allows for the reliable destruction of the destructible portion and cost-effective production of the first yarn. The first yarn may be dyed or may be entirely unbleached and/or undyed.

Furthermore, the destructible portion may comprise polyvinyl alcohol, and in particular may be formed therefrom.

Polyvinyl alcohol can be reliably destroyed/dissolved by pressure boiling. In particular, polyvinyl alcohol with a high degree of hydrolysis and polymerisation can be used for the destructible portion. A high degree of hydrolysis may, in particular, be present from 70%, further from 80%, again from 90%, and finally from 95%. A high degree of polymerisation may, in particular, be present from 1000, further from 1500, again from 2000, and finally from 2500. The limits of the degree of hydrolysis and the degree of polymerisation may be combined as desired, and every combination is explicitly included in the invention. According to the invention, the polyvinyl alcohol cannot be destroyed at atmospheric pressure and below the boiling point of 100°C.

Alternatively, or in addition, the destructible portion may comprise synthetic fibres or be formed from synthetic fibres that can be destroyed by a chemical. For example, acetate can be dissolved by the solvent acetone, whilst PVC can also be dissolved by acetone, or by diethyl ether, chloroform or hydrochloric acid (and others). However, the resulting decomposition products pose significant challenges for post-treatment – key term: 'regenerable process fluid'. For this reason, it is preferable to modify synthetic fibres to make them destructible, e.g. modified polyethylene terephthalate with reduced alkali resistance (available, for example, from BYR International under the product names AXTRE® and SOLUCELL®).

Appropriately modified polyethylene terephthalate can be reliably destroyed/dissolved by pressure boiling. In the case of modified polyethylene terephthalate, the individual components are chemically dissolved by pressure boiling in an alkaline solution (by adding sodium hydroxide to the fluid). The resulting components (glycols/monomers) are inorganic carbon compounds (so-called DACs, standing for 'degradable anorganic carbons') that are highly bio-degradble by biological systems, provided the process water solution is returned to the neutral pH range using sulfuric acid, at which point they are present as salts. Pressure boiling therefore promotes, under stoichiometrically correct conditions, the largely complete dissolution of solids, whilst ensuring high process reliability and achieving this in a very short time. Furthermore, according to the invention, modified polyethylene terephthalate cannot be destroyed in water at atmospheric pressure and below the boiling point of 100°C.

The destructible portion may comprise a variety of different materials which are destructible, particularly at different temperatures and/or pressures. In particular, the destructible portion may comprise polyvinyl alcohol and modified polyethylene terephthalate.

This allows a suitable combination of materials for the destructible portion to be provided on an application-specific basis. As a result, improved properties can also be achieved for the first yarn. The combination of the two materials may be intimately integrated, i.e. formed within

a single fibre of the first yarn. However, it is also possible to form at least one fibre with one material and at least one other fibre with the other material.

According to a second aspect, a connecting structure is provided, comprising: an areal portion; a coupling element; and the seam structure according to at least one of the preceding aspects, wherein the areal portion and the coupling element are coupled via the seam structure.

This enables a connecting structure, in particular a textile connecting structure, to be provided which exhibits the above effects. The areal portion may be a textile areal portion, for example made of fabric or leather. The coupling element may also be an areal portion, in particular a textile areal portion, or may, for example, be a button.

The connecting structure is also suitable for separation by material type. In particular, following separation, the areal portion, the coupling element and the second yarn may each be available for a recycling process.

In the connecting structure, the second yarn may be exposed, at least in portions, towards an outer side of the connecting structure.

As the second yarn can be designed to meet specific requirements, it is therefore advantageous for the second yarn to be visible. This can be particularly helpful if the second yarn has undergone surface treatment. In textile connecting structures, the outer side is an easily identifiable side and may, for example, be a functional side.

Furthermore, the areal element and/or the coupling element may be formed, at least in portions, from the material of the second yarn.

This is advantageous with regard to recycling. In particular, such a connecting structure is ideally suited to sorting by material type. In this context, the second yarn may remain in the areal portion and/or coupling element and, where appropriate, be recycled together with the areal portion and/or coupling element.

According to a third aspect, a method is provided for separating a seam structure or the connecting structure in accordance with at least one of the above aspects. The method comprises: - pressure boiling the seam structure, wherein the destructible portion of the first yarn is destroyed.

In this way, the seam structure can be reliably separated. The conditions mentioned above apply to the pressure boiling, in particular with regard to temperature and pressure.

The pressure boiling may take place in a sealed container in which the seam structure or connecting structure is placed. The container may be pressurised by the fluid inside it.

The fluid used for pressure boiling (for example, water or an aqueous solution) may be moved relative to the seam structure during the pressure boiling process. This movement of the fluid relative to the seam structure accelerates the destruction of the material forming the destructible portion and promotes the removal of the destroyed destructible portions from the seam structure, thereby enabling particularly efficient separation of the seam structure.

Pressure boiling may involve flushing the seam structure with a fluid.

In this context, flushing refers to the supply and discharge of the fluid during pressure boiling and the separation of the seam structure. In other words, the seam structure or connecting structure is not immersed in a stationary fluid. This allows the dissolved destructible portion to be transported away.

A large number of seam structures can be pressure boiled which, in terms of material, have the same destructible portion.

This allows several seam structures to be separated simultaneously in a pressure boiling process, wherein the destroyed destructible portions are homogeneous and thus able to be collected or recycled together.

Furthermore, at least the second yarn can be supported during pressure boiling.

As the destructible portion is destroyed during pressure boiling, this prevents the second yarn from becoming tangled. However, the connecting structure as a whole can be supported. In particular, the seam structure or connecting structure can be supported along its entire length. This support comprises, in particular, support on both sides; more specifically, clamping of the seam structure or the connecting structure.

The support may be provided by a permeable support means, into which the fluid can flow. A wide-mesh textile bag or a perforated metal container may serve as the support means. The support means may be designed to stretch the seam structure or the connecting structure. This ensures that the entire destructible portion or the entire first yarn is destroyed, as it can be completely wetted with fluid.

According to a fourth aspect, a use of a pressure boiling device as a separation device for separating a seam structure or a connecting structure in accordance with at least one of the above aspects is provided, which pressure boiling device comprises: - a container for holding a fluid; - a fluid delivery means configured to move the fluid inside the container; and - a heating means configured to heat the fluid; and - a permeable support means configured to receive a seam structure or a connecting structure according to at least one of the above aspects, and arranged within the container.

This device enables a seam structure or a connecting structure according to the invention to be reliably separated. The fluid delivery means may, for example, comprise a pump. The heating means may, for example, comprise a heating band and/or a fan. Examples of the support means have already been given above.

The separation device may have the seam structure or the connecting structure arranged within the support means.

Brief description of the drawings

The invention is described in detail below with reference to the drawings.

Fig. 1 shows a cross-section of a connecting structure according to the invention.

Fig. 2 shows a preparatory step for pressure boiling.

Fig. 3 shows a state in which a connecting structure is being pressure boiled.

Detailed description of exemplary embodiments

Unless otherwise stated, the same reference signs are used for the same elements in the figures.

Fig. 1 shows a longitudinal section of a connecting structure 100 according to the invention. The connecting structure 100 is, in this case, a textile connecting structure. It comprises a first textile areal portion 101 (areal portion in the sense of the claims) and a second textile areal portion 102 (coupling element in the sense of the claims). The first areal portion 101 is arranged over the second areal portion 102, and they overlap one another in the thickness direction of the areal portions. Both areal portions may be formed from fabric or leather, or one may be formed from fabric and the other from leather.

The connecting structure 100 further comprises a seam structure 103. The seam structure 103 joins the first areal portion 101 and the second areal portion 102 to one another so that they are secured together. The seam structure 103 extends in a longitudinal direction perpendicular to the thickness direction.

The seam structure 103 comprises a first yarn 103a and a second yarn 103b, each of which extends in the longitudinal direction and has alternating peaks and troughs in the longitudinal

direction. A number of peaks of the first yarn 103a each cross a corresponding trough of the second yarn 103b at corresponding crossing points.

The first yarn 103a and the second yarn 103b form a seam. In this case, a double lockstitch is formed as the seam, which can, for example, be produced using a sewing machine. The first yarn 103a may be a bobbin thread, and the second yarn 103b may be a needle thread.

The first yarn 103a lies exposed, at least in portions, with its troughs facing the inner side B.

The second yarn 103b lies exposed, at least in portions, with the peaks facing the outer side A.

The first yarn 103a is formed entirely of modified polyethylene terephthalate. Consequently, the first yarn 103a is formed entirely of a destructible portion. The first yarn 103a may be formed from a plurality of fibres, all of which are made of modified polyethylene terephthalate. The modification refers to the ‘non-resistance or limited resistance’ to strong alkalis (pH 12–14).

The second yarn 103b is also formed from a plurality of fibres. The second yarn 103b may be made from a natural material, a semi-synthetic material or a synthetic material, wherein the material differs from a material of the destructible portion, i.e. in this case the first yarn 103a. In this embodiment, the material of the second yarn 103b corresponds to the material of the first areal portion 101. Both may, for example, be made of cotton.

According to the invention, the first yarn 103a comprises the destructible portion, which can be destroyed by pressure boiling.

Consequently, the first yarn 103a can withstand relatively high temperatures during washing and exhibit the required stiffness/strength. Furthermore, the first yarn 103a with the destructible portion is used only partially in the seam structure alongside the second yarn. Consequently, technical, tactile and/or visual requirements can be met via the second yarn 103b, in particular through the choice of material for the second yarn, which differs from the material of the destructible portion. Furthermore, the cost-effectiveness can be increased through the only partial use of the first yarn 103a with the destructible portion. Pressure boiling can be carried out in a straightforward manner, which in turn can enhance cost-effectiveness when separating the seam structure.

The present invention is particularly suitable for the separation of the seam structure into its constituent materials. Thus, the first fabric portion 101 and the second yarn 103b, which consist of cotton, can be subjected to a recycling process. On the other hand, the second

fabric portion 102b, which consists, for example, of a synthetic fabric, can be subjected to a different recycling process.

After pressure boiling, the destructible portion (first yarn 103a) is present in dissolved form in a fluid. This solution can be further processed as appropriate.

Pressure boiling is carried out as follows. Reference is made to Figures 2 and 3, which show a separation device 10 according to the invention.

Fig. 2 shows a preparatory step for pressure boiling. A connecting structure 1, which may, for example, be the connecting structure 100 described above, is placed in a permeable support means 5. The permeable support means 5 is formed here by a metal container. The metal container comprises a wide-mesh wire mesh.

In this case, several connecting structures 1 are placed into each support means 5. However, only one connecting structure 1 per support means may also be provided. The seam ends may be opened prior to pressure boiling, in particular prior to insertion into the support means, in order to destroy the first yarn more reliably.

A plurality of support means 5 are inserted into a sealable container 11. It should be noted that the seam structures of the connecting structures 1 in each support means 5 and across the plurality of support means 5 are identical with regard to the material of the first yarn 103a.

Each support means 5 receives the connecting structures 1 in such a way that their position relative to the support means is substantially fixed. Deformation of the connecting structure 1 can also be prevented to the greatest extent possible. To this end, the support means supports the connecting structure 1 on all sides. In particular, it can clamp the connecting structure 1.

The support means 5 can be inserted into the container 11 via a container opening 11a and secured in a specific position within the container 11, but may also be provided loosely within the container. In this case, the support means may rest on a base 12 of the container 11 and be secured thereto.

Once the support means 5, together with the connecting structures 1, have been positioned in the container 11 and a fluid for pressure boiling has been filled to a fill level 20 (see Fig. 3), which lies below the maximum filling volume of the container 11 but covers the connecting structures 1 within the container, the container opening 11a is sealed in a pressure-tight and gas-tight manner with a lid 15 of the container 11, as shown in Fig. 3. The container 11 comprises a feed portion 11b and a discharge portion 11c, through which the fluid can be fed in and discharged. In particular, the feed portion 11b and the discharge portion 11c are spaced further apart than the length of the support means 5. In other words, the feed portion 11b and

the discharge portion 11c are arranged such that the support means is positioned between them in the direction of gravity.

Filling with fluid up to a maximum fill volume is conducive to a rapid rise in pressure. A liquid is used as the fluid here, in particular pure water. However, particularly in the case of modified polyethylene terephthalate, a chemical additive may be added to the water, such as a lye, in particular caustic soda (NaOH), or an acid. The fluid, in this case water and caustic soda solution, is heated to a temperature between 110°C and 120°C by a heating means 14, which is arranged in the base 12, as shown schematically in Figures 2 and 3.

During the heating by the heating means 14 and/or once the desired target temperature has been reached, a fluid delivery means 13, also located in the base and designed here as a circulation pump, circulates the fluid through the container 11, thereby flushing the connecting structures 1, including the seam structures. The feed and discharge portions may be blocked during this process.

During heating, the pressure inside the container also rises, as the residual gas above the fill level cannot escape. The pressure may, for example, rise to at least 2 bar.

The excess pressure relative to atmospheric pressure allows the temperature to be raised further above the respective boiling point, in particular that of water, which is 100°C at atmospheric pressure. It also aids the dissolution of the destructible portion, in this case the entire first yarn 103a. If the seam structure is continuously pressure boiled for a specified period, for example several minutes, at a specified temperature, for example within the above range between 110°C and 120°C, and at a specified pressure, for example 2 bar, the destructible portion is destroyed.

The destruction of the destructible portion also causes the seam structure to separate.

Once the entire first yarn 103a has been destroyed, that is, has dissolved, the fluid is discharged from the container 11.

The support means 5 are then removed from the container 11, and the connecting structures 1, together with the separated seam structures, are removed from the support means 5. As the seam structure is separated, the areal portion, the coupling element and the second yarn can be easily separated from one another mechanically. Each element can thus be sorted by material type, meaning it can be subjected to a specific recycling process without requiring further separation.

The above steps can be carried out by machine and can be semi- or fully automated.

The following features may be combined individually or in combination with the above embodiment.

The second yarn 103b may be designed such that it cannot be destroyed by pressure boiling. However, it may be destructible by other means.

Alternatively, the second yarn 103b may be destructible at a different temperature and/or pressure and/or with a different fluid than the first yarn 103a. In this case, for example, the second yarn 103b may be destructible at a temperature between 120°C and 130°C. The pressure boiling may be carried out in stages, such that the destructible portion is destroyed first and the temperature and/or pressure is subsequently increased so that the second yarn 103b is destroyed.

In particular, the second yarn 103b may have a higher stiffness and/or strength than the first yarn 103a, in particular the destructible portion.

The second yarn 103b may be surface-treated. For example, it may be dyed or surface-treated in some other manner, as indicated above. Furthermore, the first yarn 103a, or at least its destructible portion, may not be surface-treated.

This embodiment describes a case in which the first yarn is formed entirely from modified polyethylene terephthalate. However, the first yarn may also be formed only in its destructible portion. The destructible portion may also be provided only at at least one crossing point.

Alternatively, the destructible portion or the entire first yarn may be formed from polyvinyl alcohol with a high degree of polymerisation and hydrolysis. In this case too, pressure boiling may be carried out using water and, if necessary, a chemical additive, such as a lye and/or acid.

It is also possible for the destructible portion or the entire first yarn to comprise a variety of materials, such as modified polyethylene terephthalate and polyvinyl alcohol, which are destructible under different conditions but using the same fluid. In this case too, pressure boiling can be carried out using water and, where appropriate, a chemical additive, such as a lye and/or acid. In this case in particular, pressure boiling may be carried out in stages. During staged pressure boiling, fresh fluid without degraded material may be continuously fed into the container 11 via the feed portion 11b and then discharged with degraded material via the discharge portion 11c, so that the destroyed materials do not mix. In this process, a feed pump may be used as the fluid delivery means instead of the circulation pump. Alternatively, after pressure boiling at a predetermined temperature and/or pressure, the fluid may be discharged, and fresh fluid may be fed in for pressure boiling at an elevated temperature and/or pressure.

It is not necessary for the second yarn to be made of the same material as the areal portion and/or the coupling element.

Furthermore, the second yarn may also be arranged on an inner side.

The separation device with the container has been described above. However, an autoclave or a high-temperature dyeing vat may also be used to carry out the pressure boiling.

The pressure boiling process described above involves the ‘packing’ method, wherein the seam structure or connecting structure is enclosed (packed) within the support means. However, the seam structure or connecting structure may also be pressure boiled without being packed.

Claims

1. A seam structure (103) comprising:

a first yarn (103a) which has a destructible portion; and

a second yarn (103b) which, together with the first yarn (103a), forms a seam and is formed from a material different from a material of the destructible portion,

wherein at least the destructible portion is formed from a material which is resistant in water at a temperature below 100°C and can be destroyed by pressure boiling in water or in an aqueous solution at a temperature above 100°C.

2. The seam structure (103) according to claim 1, wherein

the second yarn (103b) is not destructible by pressure boiling.

3. The seam structure (103) according to claim 1, wherein

the second yarn (103b) can be destroyed by pressure boiling under conditions other than those for the destructible portion.

4. The seam structure (103) according to claim 1 or 2, wherein

the second yarn (103b) has a higher stiffness and/or strength than the destructible portion.

5. The seam structure (103) according to at least one of the preceding claims, wherein

the second yarn (103b) is surface-treated, at least in portions, in particular bleached and/or dyed, and

the destructible portion is, at least in portions, unbleached and/or undyed.

6. The seam structure (103) according to at least one of the preceding claims, wherein

the destructible portion comprises polyvinyl alcohol, in particular is formed therefrom.

7. The seam structure (103) according to at least one of the preceding claims, wherein

the destructible portion comprises modified polyethylene terephthalate, in particular is formed therefrom.

8. The seam structure (103) according to at least one of the preceding claims, wherein

the destructible portion comprises a plurality of different materials, which are destructible, in particular, at different temperatures and/or pressures, and/or

the destructible portion comprises polyvinyl alcohol and modified polyethylene terephthalate.

9. A connecting structure (100) comprising:

an areal portion (101);

a coupling element (102); and

the seam structure (103) according to at least one of the preceding claims, wherein

the areal portion (101) and the coupling element (102) are coupled via the seam structure (103).

10. The connecting structure (103) according to claim 9, wherein

the second yarn (103b) is exposed, at least in portions, towards an outer side of the connecting structure.

11. The connecting structure (103) according to claim 9 or 10, wherein

the areal element (101) and/or the coupling element (102) is formed, at least in portions, from the material of the second yarn (103b).

12. A method for separating a seam structure (103), which seam structure (103) comprises: a first yarn (103a) and

a second yarn (103b) which, together with the first yarn (103a), forms a seam, wherein the first yarn (103a) has at least one destructible portion formed from a material which is stable in water at a temperature below 100°C and which can be destroyed by pressure boiling in water or in an aqueous solution at a temperature above 100°C;

wherein the method comprises:

- pressure boiling the seam structure (103) in water or in an aqueous solution at a temperature above 100°C, wherein the destructible portion of the first yarn (103a) is destroyed.

13. The method according to claim 12, wherein the water or aqueous solution is moved relative to the seam structure during the pressure boiling.

14. The method according to claim 12 or 13, wherein

a plurality of seam structures (103) are pressure boiled, which have the same destructible portion in terms of material.

15. A method according to any one of claims 12 to 14, wherein

at least the second yarn (103b) is supported during the pressure boiling.

16. Use of a pressure boiling device as a separation device (10) for separating a seam structure (103) according to at least one of claims 1 to 8, or for separating a connecting structure according to one of claims 9 to 11, or for carrying out a method for separating a seam structure (103) according to any one of claims 12 to 15, which pressure boiling device comprises:

- a container (11) for receiving a fluid;

- a fluid delivery means (13) configured to move the fluid inside the container (11); and

- a heating means (14) configured to heat the fluid; and

- a permeable support means (5) configured to receive a seam structure (103) or a connecting structure (100) comprising at least one seam structure (103) according to at least one of claims 9–11, and arranged within the container (11).