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(54) **PROTECTIVE COVER FOR BEDDING OR BEDDING EQUIPPED WITH PROTECTIVE COVER**

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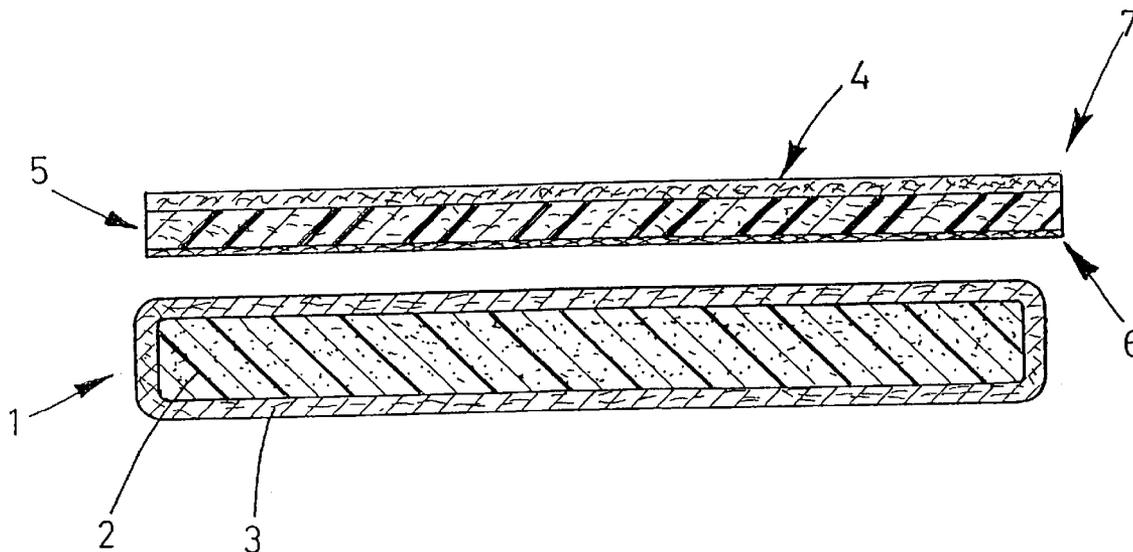
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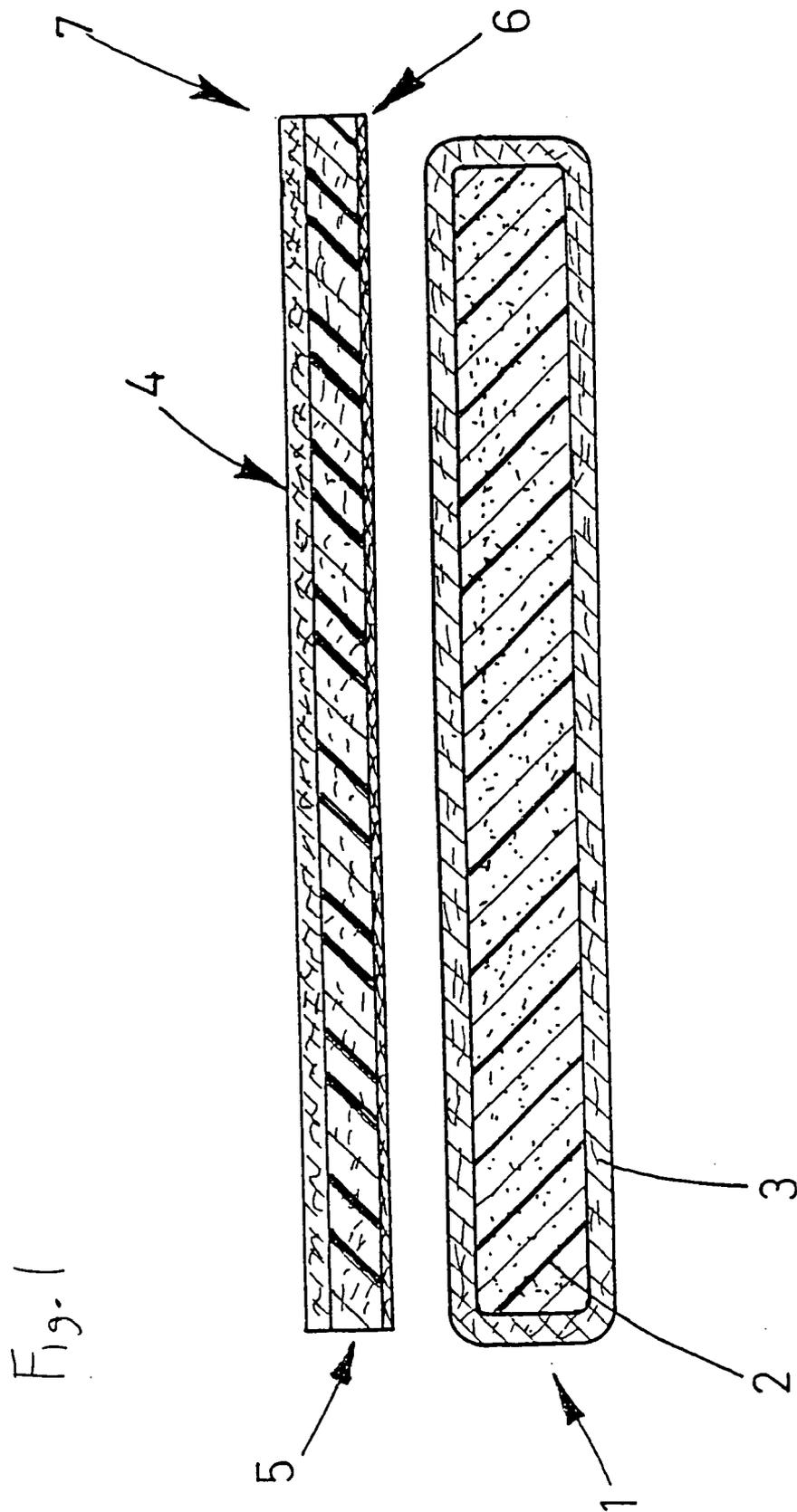
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(57) **ABSTRACT**

Bedding article which includes a core and a flame-resistant protective cover surrounding and enclosing the core. This Abstract is not intended to define the invention disclosed in the specification, nor intended to limit the scope of the invention in any way.





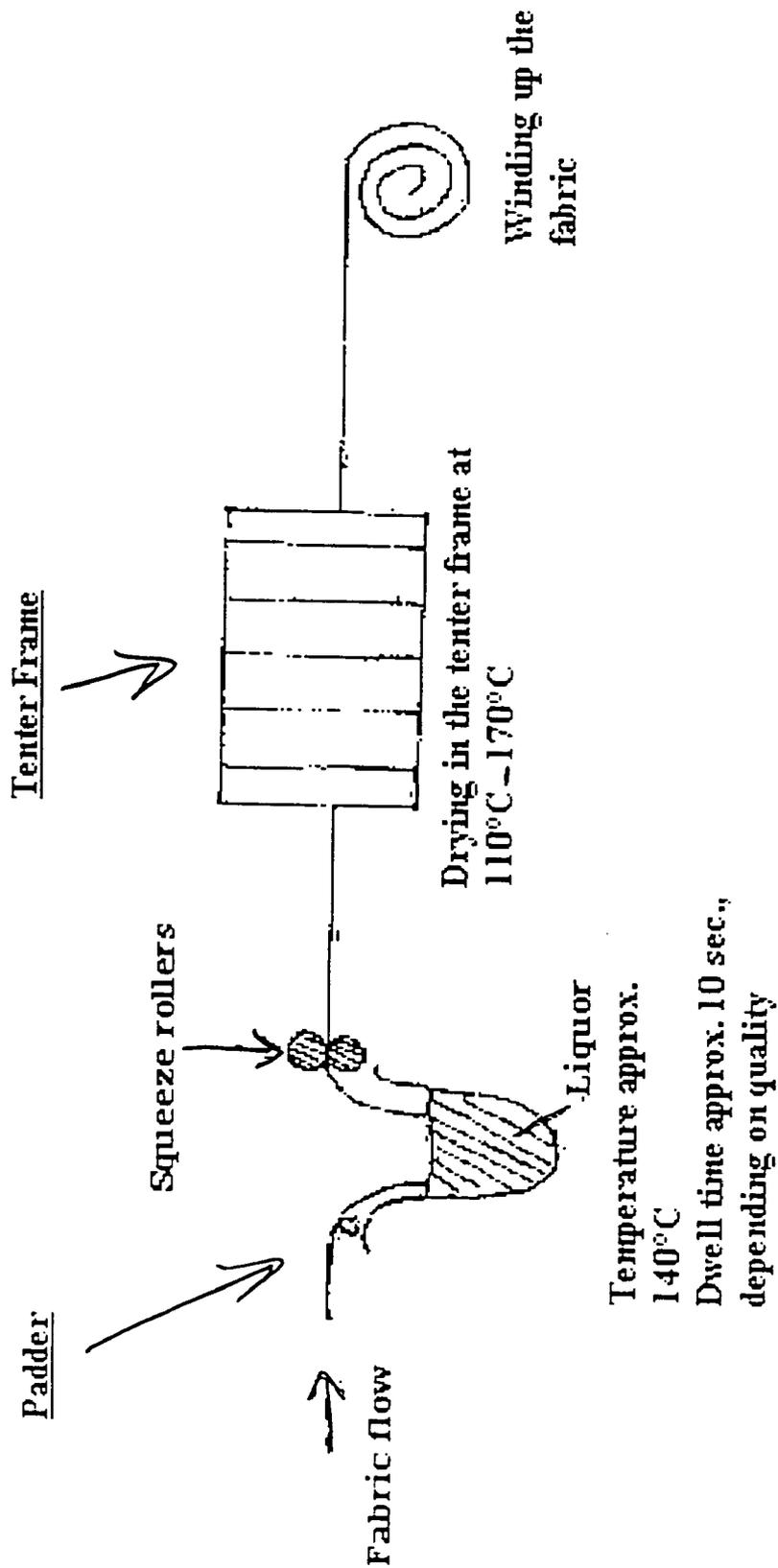


Fig. 2

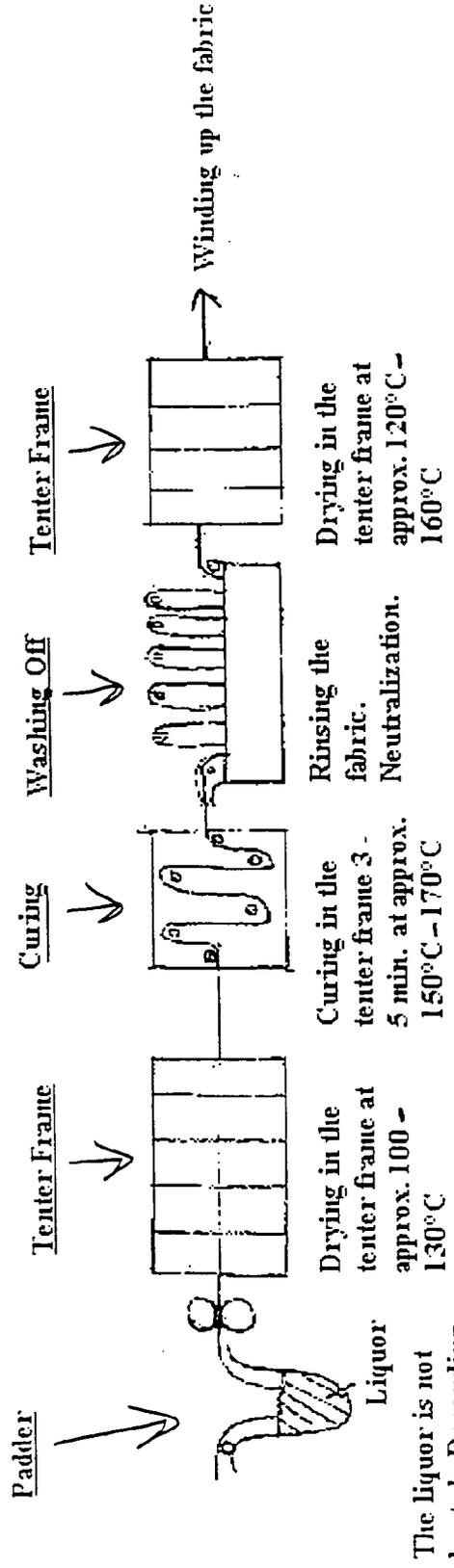


Fig. 3

**PROTECTIVE COVER FOR BEDDING OR
BEDDING EQUIPPED WITH PROTECTIVE
COVER**

CROSS-REFERENCE TO RELATED
APPLICATIONS

[0001] The present application claims priority under 35 U.S.C. §119 of German Patent Application No. 20 2004 012 978.7, filed on Aug. 19, 2004, and German Patent Application No. 203 18 510.2, filed on Nov. 29, 2003, the disclosures of which are expressly incorporated by reference herein in their entireties.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The invention relates to a protective cover for beds and things associated with beds. The invention also relates to a protective cover for, among other things, a mattress, a pillow, a bed pad, or the like. The invention also relates to a bed which is equipped with a protective cover.

[0004] 2. Discussion of Background Information

[0005] Bedding, such as, e.g., mattresses or pillows, can be easily ignited in the event of a fire. Moreover, the resulting burning of the bedding or the resulting strongly smoking of the bedding presents a significant hazard to the user. This is particularly problematic if the core of the bedding is made of flammable materials such as, e.g., polyether, latex, a viscose material, or a flammable box spring.

SUMMARY OF THE INVENTION

[0006] According to one non-limiting embodiment of the invention, there is provided bedding which includes a core, which can be e.g., a mattress core, and an arrangement which provides protection to the core so as to at least greatly reduce the flammability of the core while also allowing for the use a great variability of cover materials on the top of the bedding and facing the user.

[0007] The invention also provides for a protective cover for bedding, such as, e.g., mattresses, pillows or bed pads.

[0008] According to one aspect of the invention, the protective cover is rendered at least flame-resistant and can be arranged to directly surround the core of the bedding. In this way, other materials or pads can be used and/or arranged on the surface of the bedding, i.e., covering the protective cover. In this case, the protective cover and the core would form an "inner core" of the bedding, so that the user sees and/or feels only the other covering materials. This is advantageous because the user will likely be more pleased if the user sees/experiences a familiar surface cover for the bedding and does not even notice the protective cover enclosing only the inner core of the bedding.

[0009] Advantageous embodiments of the protective cover include, among other things, protective covers which are made of natural fibers, such as, e.g., cellulose fibers or cotton fibers. The protective cover can even be made entirely of cotton. In the cotton, the supplied cotton and/or cotton fibers is provided with a flame-resistant finish and/or coating and/or treatment.

[0010] The protective cover can also be made separable and/or removable from the bedding and/or from the inner core of the bedding. This makes it possible to, e.g., launder and/or more easily clean the protective cover. For example, the non-flammable finish of the protective cover can be embodied such that it is permanently wash proof in order to retain the properties of the flame-resistant finish even after repeated washing. Of course, the invention contemplates flame-resistant finishes which are not permanently wash proof, i.e., which may lose flame-resistance over time through repeated washings.

[0011] The invention also provides for a protective cover which includes and/or is made of one or more of the following qualities/properties/materials:

[0012] single jersey fabric;

[0013] double jersey fabric;

[0014] double jersey fabric with a filling material;

[0015] terry toweling fabric qualities;

[0016] velour fabric qualities; and

[0017] woven fabric.

[0018] These materials can be used in order to provide excellent protection to the core of the bedding with respect to flammability while also being cost-effective to manufacture. The protective cover can prevent the core from burning and/or catching fire by, e.g., preventing melted fibers located on top of the bedding from reaching the core of the bedding and/or preventing the core from igniting therein. The protective cover can also ensure that melted synthetic fibers, which may come in contact with the protective cover, do not cause melting of the fibers of the protective cover, and thus are prevented from reaching and/or contacting the core of the mattress.

[0019] The invention also provides for bedding wherein the core of the bedding has a covering of at least one flame-resistant material.

[0020] According to another non-limiting advantageous embodiment of the invention, the bedding is provided with a pad that is provided on the top of the protective cover and/or is provided to completely cover the protective cover so that the protective cover is arranged between the core and the pad.

[0021] The invention also provides for a bedding article comprising a core and a flame-resistant protective cover surrounding and enclosing the core. The bedding article may comprise a mattress. The bedding article may comprise a pillow. The bedding article may comprise a bed pad. The bedding article may comprise a bed cover. The flame-resistant protective cover may completely surround and completely enclose the core. The flame-resistant protective cover may directly contact an outer surface the core. The flame-resistant protective cover may comprise at least one natural fiber material. The at least one natural fiber material may comprise cotton. The cotton may comprise fibers with a flame-resistant finish. The flame-resistant protective cover may be removable from the core. The flame-resistant protective cover may be removable from the core via a fastening arrangement. The fastening arrangement may comprise at least one zipper.

[0022] The flame-resistant protective cover may comprise a flammable material with at least one of a flame-resistant finish and a flame-resistant treatment. The flame-resistant protective cover may comprise a permanent flame-resistant finish. The flame-resistant protective cover may comprise a wash-proof flame-resistant finish, whereby the wash-proof flame-resistant finish withstands repeated washing of the flame-resistant protective cover. The flame-resistant protective cover may comprise a tricot bag. The flame-resistant protective cover may comprise a single jersey fabric. The flame-resistant protective cover may comprise a double jersey fabric. The core may comprise one of a latex core, a foam core, and a box spring.

[0023] The bedding article may further comprise an outer pad arranged over the flame-resistant protective cover. The bedding article may further comprise an outer covering arranged to surround the flame-resistant protective cover. The bedding article may further comprise a removable outer pad arranged over the flame-resistant protective cover. The bedding article may further comprise a removable outer covering arranged to completely surround the flame-resistant protective cover. The bedding article may further comprise an outer covering completely surrounding and enclosing the flame-resistant protective cover. The bedding article may further comprise a multi-layer outer covering completely surrounding and enclosing the flame-resistant protective cover.

[0024] The invention also provides for a bedding article comprising a mattress core and a flame-resistant protective cover completely surrounding and enclosing the mattress core.

[0025] The invention also provides for a bedding article comprising a core, a removable flame-resistant protective cover completely surrounding and enclosing the core, and a non-flame-resistant outer covering completely surrounding and enclosing the removable flame-resistant protective cover.

[0026] The invention also provides for a bedding article comprising a mattress core, a removable flame-resistant protective cover completely surrounding and enclosing the mattress core, and a removable non-flame-resistant multi-layer outer covering completely surrounding and enclosing the removable flame-resistant protective cover.

[0027] Other exemplary embodiments and advantages of the present invention may be ascertained by reviewing the present disclosure and the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] The present invention is further described in the detailed description which follows, in reference to the noted plurality of drawings by way of non-limiting examples of exemplary embodiments of the present invention, in which like reference numerals represent similar parts throughout the several views of the drawings, and wherein:

[0029] FIG. 1 shows a cross-section of mattress having a mattress core and a protective cover surrounding the core. A portion of a three-layer mattress covering is shown in cross-section above the mattress. The mattress covering material can be used to cover the protective cover and core;

[0030] FIG. 2 schematically illustrates a Flovan finish process; and

[0031] FIG. 3 schematically illustrates a Pyrovantex finish process.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0032] The particulars shown herein are by way of example and for purposes of illustrative discussion of the embodiments of the present invention only and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the present invention. In this regard, no attempt is made to show structural details of the present invention in more detail than is necessary for the fundamental understanding of the present invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the present invention may be embodied in practice.

[0033] The drawing shows a mattress 1 having a mattress core 2 and a protective cover 3. The mattress core 2 can be made of a plurality of materials, such as, e.g., one or more latex materials, one or more diverse foams (such as, e.g., polyether, cold foam, viscose foam, a so-called memory foam, etc.). The mattress core 2 can also be, e.g., a box spring which may or may not include a latex or foam cover.

[0034] The mattress core 2 can be embodied as an "inner" mattress core which is completely enclosed and/or covered by the protective cover 3. The protective cover 3 can be a tricot bag and can be arranged to directly surround and/or contact the mattress core 2. In this way, the protective cover 3 acts as a cover which protects the core 2 from melting. In the event of fire, or e.g., if a piece of burning material and/or if an amount of melted material (such as Trevira SC) falls on the protective cover 3, the protective cover 3 will prevent these burning or melting/melted materials from penetrating into the mattress core 2.

[0035] The protective cover 3 can advantageously be made of a flame-resistant material and/or of a non-flammable material. The material of the protective cover 3 can also advantageously be made of one or more natural materials and/or natural fibers, such as, e.g., cotton or cellulose.

[0036] 100% cotton has proven successful as an effective material for the protective cover 3 because cotton can be advantageously provided with a flame-resistant finish and/or treatment.

[0037] In an advantageous embodiment, the protective cover 3 is arranged and/or configured to be removable from the mattress core 2. Such an arrangement can be provided by e.g., arranging a zipper on one or more of the side edges of the protective cover 3 in order to make it possible for the protective cover 3, which would enclose the entire mattress core 2, to be installed and/or removed from the mattress core 2. Of course, the zipper can also be arranged the top and bottom of the mattress core, in addition to be arranged along the longer sides of the mattress core 2.

[0038] The protective cover 3 can be made so that it retains a permanently wash proof quality, i.e., the protective cover 3 retains its flame-resistant finish even after repeated laundering. However, it is also possible to equip the protective cover 3 with a finish that is not permanently washproof.

[0039] According to one non-limiting embodiment of the protective cover 3, it has the form of a tricot bag which is

made of a single jersey or a double jersey fabric. This embodiment has the advantage of providing good protection for the mattress core 2 and prevents the mattress core 2 from melting.

[0040] In addition to the protective cover 3, the mattress 1 can also include an outer covering 7 which can also completely surround the core 2 and protective cover 3. This outer covering 7 is the part of the mattress which comes in contact with and/or which faces the user. The outer covering 7 can be provided, in particular, to improve and/or increase sleep comfort for the user. According to one non-limiting embodiment, the outer covering 7 can be made removable in the same way as the protective cover 3. Alternatively, the outer covering 7 can be made to permanently cover the protective cover 3 and core 2. The outer covering 7 includes an upper layer or outer fabric 4, an intermediate layer 5, and a lower layer or inner fabric 6. The intermediate layer 5 can be, e.g., a nonwoven fabric and/or a pad. Non-limiting examples of the pad include, e.g., a quilted foam pad or a latex pad. The lower layer 6 can be, e.g., a quilted fabric. Non-limiting examples of the quilted fabric include, e.g., a nonwoven fabric or a woven fabric. The combination of an outer fabric 4, an intermediate layer 5 and a lower layer 6 makes it very pleasant to lie on the mattress 1, on the one hand, and on the other hand, can provide a good moisture removal effect. This can be achieved, in particular, by using suitable materials or by processing the materials properly with this in mind. By utilizing the outer covering 7, the user can customize and/or provide familiar materials, textures, and processing qualities on top of the mattress 1 and the fire-protection for the mattress can be disguised by virtue of the fact that the protective cover 3, which covers only the inner core 2 of the mattress, is not noticeable at all because it is covered by the outer covering 7.

[0041] With regard to the flame-resistant finish, we differentiate between non-washable and permanently washproof covers.

[0042] By way of non-limiting example, the flame resistance can be imparted to and/or provided on non-washable fabrics using a "FLOVAN GGN" finish. In this case, the material is treated with a nitrogenous phosphonic acid salt.

[0043] Also by way of non-limiting example, the flame resistance can be imparted to and/or provided on permanently washproof fabrics using a "Pyrovatex CP" finish. In this case, the fabric is finished with an organophosphorus compound.

[0044] Using such methods ensures that upon exposure to fire, a carbon backbone is formed which protects, e.g., the mattress core, against heat.

[0045] FIG. 2 illustrates one non-limiting way in which the finishing method with Flovan (i.e., to non-washable fabrics) can be applied. The untreated material is first washed to remove the fiber-accompanying substances and dried. Then the material runs through a padder (basin) and is soaked with a special bath. The bath includes water and Flovan, as explained above. The flame resistance is achieved by soaking the fabric in the bath. The material is then dried and wound.

[0046] The process shown in FIG. 2 will now be described more specifically. The application of the treatment occurs by impregnation, which is made via the padder. The fabric is

fed into the padder which contains the Flovan. The liquid containing the Flovan has a temperature of approximately 140° C. and the fabric is exposed to the liquid for a dwell time of approximately 10 seconds depending on the quality. Drying is the next phase. The tenter drying should be carried. The recommended drying temperature in the tenter frame is between approximately 110° C. and approximately 170° C. In the last stage, the fabric wound up.

[0047] FIG. 3 illustrates one non-limiting way in which the finishing method with Pyrovatex (i.e., to permanently washproof fabrics) can be applied. The untreated material is first washed to remove the fiber-accompanying substances and dried. Then the material runs through a padder (basin) and is soaked with a special bath. The bath comprises water, Pyrovatex (as explained above) and a catalyst and/or phosphoric acid. It is important that the material is then dried in a tenter frame. A chemical reaction is triggered through the heat in the tenter frame. The phosphoric acid that acts in the crosslinking of the catalyst must now be removed from the substrate, after scouring is thus unavoidable. After the washing, the material is again dried and wound.

[0048] The process shown in FIG. 3 will now be described more specifically. The application of the treatment occurs by impregnation, which is made via the padder. Care should be taken to ensure a sufficient liquor pickup (between approximately 70% and approximately 90%) depending on the fabric weight and construction. This is achieved through the use of absorbent fabric, long dipping sections of the fabric in the liquor, and the longest possible immersion period (which can be effected by regulating padder speed). Drying is the next phase. The tenter drying should be carried out with the greatest possible overfeed. The recommended drying temperature in the first field is approximately 110° C., and the temperature in the other fields should not exceed approximately 130° C. in order to guarantee minimal migration. If the fabric is not cured immediately after finishing, it has to be protected against air humidity. This can be achieved by winding it up and wrapping it with a plastic film. Uncured CP-LF-finishes are hygroscopic, excessive residual moisture before curing can lead to a harder fabric hand due to migration. Curing can then take place. When a curing machine is used, between approximately 3 minutes and approximately 5 minutes at approximately 150° C. has to be ensured. With curing on a tenter frame, between approximately 30 seconds and approximately 60 seconds at approximately 170° C. is sufficient. Regular monitoring of the curing effect is recommended.

[0049] It should be noted, however, that drying and curing should be carried out with the greatest possible air renewal in the machines. This makes it possible to largely avoid soiling. If the fabric is wound after curing, it is expedient to cool it beforehand, e.g., by cooling rolling to a temperature below approximately 40° C.

[0050] Washing off process occurs next. The phosphoric acid acting during the crosslinking of the catalyst must be removed from the substrate: a washing off process is thus essential. The washing off process is preferably carried out within approximately 24 hours after curing. The washing off process is usually carried out with a full-width washer with at least 5 washing compartments or with a winch back; though smaller batches can also be washed off on a jig. The addition of alkali to the washing liquor causes a neutraliza-

tion of the fabric and establishes an alkali pH value, so that the hydrolysis of the finish during storage of the fabric is reduced. With a continuous mode of operation on full-width washers, alkali is to be added to the washing liquor according to the throughput of the fabric. In order to achieve an adequate neutralization of the textile goods, the fabric should spend at least 2 minutes in the alkali washing liquor. The subsequent rinsing process with water should be carried out carefully in order to prevent a possible odor. The addition of between approximately 1 ml/l and approximately 2 ml/l H₂O₂ to the last rinse is recommended. After the neutralization and rising process has been completed, the fabric has to be slightly alkali and have a pH value between approximately 8 and approximately 9.

[0051] Advantageous varieties, types or materials can be utilized in the invention. Basically, cellulosic fibers and wool are better suited for these finishing methods than man-made fibers. Blends with man-made fibers can, however, also be given a flame-resistant finish. In this case, the dosage of the chemicals in the padder is determined by the fiber type, the mass per unit area, the material construction, and a potential blend of synthetic fibers such as, e.g., PES.

[0052] Advantageous thickness of the protective cover can include heavy and dense materials, which require a lower dosage than light materials, and have particularly open or voluminous qualities. This applies, in particular, to the Pyrovatex treatment.

[0053] It is noted that the foregoing examples have been provided merely for the purpose of explanation and are in no way to be construed as limiting of the present invention. While the present invention has been described with reference to an exemplary embodiment, it is understood that the words which have been used herein are words of description and illustration, rather than words of limitation. Changes may be made, within the purview of the appended claims, as presently stated and as amended, without departing from the scope and spirit of the present invention in its aspects. Although the present invention has been described herein with reference to particular means, materials and embodiments, the present invention is not intended to be limited to the particulars disclosed herein; rather, the present invention extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims.

What is claimed:

1. A bedding article comprising:
 - a core; and
 - a flame-resistant protective cover surrounding and enclosing the core.
2. The bedding article of claim 1, wherein the bedding article comprises a mattress.
3. The bedding article of claim 1, wherein the bedding article comprises a pillow.
4. The bedding article of claim 1, wherein the bedding article comprises a bed pad.
5. The bedding article of claim 1, wherein the bedding article comprises a bed cover.
6. The bedding article of claim 1, wherein the flame-resistant protective cover completely surrounds and completely encloses the core.
7. The bedding article of claim 1, wherein the flame-resistant protective cover directly contacts an outer surface the core.
8. The bedding article of claim 1, wherein the flame-resistant protective cover comprises at least one natural fiber material.
9. The bedding article of claim 8, wherein the at least one natural fiber material comprises cotton.
10. The bedding article of claim 9, wherein the cotton comprises fibers with a flame-resistant finish.
11. The bedding article of claim 1, wherein the flame-resistant protective cover is removable from the core.
12. The bedding article of claim 1, wherein the flame-resistant protective cover is removable from the core via a fastening arrangement.
13. The bedding article of claim 1, wherein the fastening arrangement comprises at least one zipper.
14. The bedding article of claim 1, wherein the flame-resistant protective cover comprises a flammable material with at least one of a flame-resistant finish and a flame-resistant treatment.
15. The bedding article of claim 1, wherein the flame-resistant protective cover comprises a permanent flame-resistant finish.
16. The bedding article of claim 1, wherein the flame-resistant protective cover comprises a wash-proof flame-resistant finish, whereby the wash-proof flame-resistant finish withstands repeated washing of the flame-resistant protective cover.
17. The bedding article of claim 1, wherein the flame-resistant protective cover comprises a tricot bag.
18. The bedding article of claim 1, wherein the flame-resistant protective cover comprises a single jersey fabric.
19. The bedding article of claim 1, wherein the flame-resistant protective cover comprises a double jersey fabric.
20. The bedding article of claim 1, wherein the core comprises one of a latex core, a foam core, and a box spring.
21. The bedding article of claim 1, further comprising an outer pad arranged over the flame-resistant protective cover.
22. The bedding article of claim 1, further comprising an outer covering arranged to surround the flame-resistant protective cover.
23. The bedding article of claim 1, further comprising a removable outer pad arranged over the flame-resistant protective cover.
24. The bedding article of claim 1, further comprising a removable outer covering arranged to completely surround the flame-resistant protective cover.
25. The bedding article of claim 1, further comprising an outer covering completely surrounding and enclosing the flame-resistant protective cover.
26. The bedding article of claim 1, further comprising a multi-layer outer covering completely surrounding and enclosing the flame-resistant protective cover.
27. A bedding article comprising:
 - a mattress core; and
 - a flame-resistant protective cover completely surrounding and enclosing the mattress core.
28. A bedding article comprising:
 - a core;
 - a removable flame-resistant protective cover completely surrounding and enclosing the core; and
 - a non-flame-resistant outer covering completely surrounding and enclosing the removable flame-resistant protective cover.

29. A bedding article comprising:
a mattress core;
a removable flame-resistant protective cover completely
surrounding and enclosing the mattress core; and

a removable non-flame-resistant multi-layer outer cover-
ing completely surrounding and enclosing the remov-
able flame-resistant protective cover.

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