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(54) Fibres containing the aromatic component of cedar, and textile materials made from such fibres

(57) Essential oil containing cedar's aromatic component is impregnated into natural fibres or textile materials woven using at least some portion of natural fibres. The essential oil may also be mixed into synthetic fibres and textile materials woven using at least some portion synthetic fibres. The fibres and textile products made according to this invention exhibit powerful insecticidal properties and exert an aromatherapeutic effect while adding little to the costs of production.

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Description

Field of the Invention

[0001] The present invention relates to natural and synthetic fibres having aromatic insect-repellent properties.

Background to the Invention

[0002] Several conventional methods exist for imparting insect-repellent properties to textile materials. One method is to apply the repellent directly onto the textile materials. Another is to add the repellent to an adhesive agent and then apply this adhesive agent to the fibre product. Yet another is to add the repellent to synthetic fibres during the spinning process.

[0003] For example, Japanese Patent Application No. 218060/1993 discloses a method for applying insect-repellent onto the back of pile cloth.

[0004] By using these methods, the textile materials can provide a level of insect protection comparable to the direct application of the repellent itself.

[0005] However, the disadvantage of using conventional and well-known insect-repellents in these methods is that they are frequently harmful to health and usually have an undesirable smell.

Summary of the Invention

[0006] An object of the present invention is to provide fibres and textile materials having effective insect-repellent properties and a desirable aromatic effect, while maintaining low production costs.

[0007] This is carried out by making use of the natural aromatic properties of oils extracted from cedars.

[0008] The oils may be impregnated into the fibres and textiles, or they may be absorbed by the fibres.

Description of the Drawings

[0009] In the accompanying drawings:

Figure 1 is a schematic illustration showing a section of a synthetic fibre that has been impregnated with essential oil;

Figure 2 is a front view of a section of natural fibre in which cedar splines have been intertwined; and

Figure 3 is a schematic diagram depicting a device that fixes cedar splines onto cloth.

Description of the Invention

[0010] The present invention is carried out using cedar instead of conventional insect-repellent. Specifically, the aromatic component of cedar is added to fibres and textile materials. The fibres may be synthetic or natural and the textile materials may incorporate either natural or synthetic fibres, or both.

[0011] The method by which essential oil is added to fabric depends on the type of fabric. For natural fibres, the simplest and most effective method is to impregnate essential oils into the natural fibre. Since natural fibres have finely branched threads and micropores, essential oil easily permeates the fibre by capillary action and remains stable inside the fibre.

[0012] Synthetic fibres, on the other hand, do not have branched threads and fine pores to the same extent as natural fibres. Accordingly, it is difficult to add essential oil to synthetic fibres simply by impregnating essential oils into the fibres. Instead, it is easier and more effective to mix the essential oil into the synthetic fibres.

[0013] The aromatic component of cedar may be obtained by purifying the essential oil from cedar.

[0014] Natural fibres are impregnated with essential oil obtained from cedar which also provides an aromatherapeutic effect. Here, natural fibres include textile materials made by using at least some natural fibres in the weaving process.

[0015] For synthetic fibres, or textile materials containing at least some synthetic fibre, the aromatic component of cedar can be added in three different forms: 1) essential oils containing cedar's aromatic component, obtained by purifying cedar; 2) powdered essential oils containing cedar's aromatic component; and 3) granules obtained by pulverizing cedar. Those additives are added into the materials used to produce the synthetic fibres in the spinning process.

[0016] Figure 1 shows a synthetic fibre (10) impregnated with essential oil (L). The synthetic fibre (10) is hollow and also contains a slit (11) in the longitudinal direction of the fibre. When essential oil (L) is applied to the synthetic fibre (10) by soaking, the hollow section (12) will absorb essential oil (L) through slit (11). In the same way, essential oil (L) in the hollow section (12) may disperse through the slit (11), ensuring a sufficient aromatic effect.

[0017] The shape of the synthetic fibre (10) is not limited to the one shown in this example. Shapes that have a section for retaining and dispersing the essential oil (L) can be used appropriately. For example, a synthetic fibre with alternating concave and convex contours can retain essential oil (L) in the surface recesses.

[0018] Mixing essential oil into hygroscopic materials coated by the synthetic fibre (10), can also produce hygroscopic materials which contain essential oil.

[0019] In an alternative method for adding cedar's aromatic component to natural fibres, cedar splines containing cedar's aromatic component, made by pulverizing cedar, are added to the natural fibres. The splines are added either in the spinning process of the natural fibres or in the weaving process of textile materials containing at least some portion of natural fibre.

[0020] Figure 2 shows sections of natural fibre (20) in which cedar splines (S) have been intertwined. Segment (S1) is intertwined between the fibre (21) during

the process of spinning the natural fibre (20). Segment (S2) shows splines intertwined between intersections (22) of the natural fibre (20) during the manufacture of textile materials. Segment (S3) shows splines intertwined between the gaps (23) of the natural fibre (20) during the manufacture of textile materials.

[0021] Since natural fibres have finely branched threads, the simple addition of splines (S) to natural fibres during the fibre spinning process or during the textile materials weaving process, successfully intertwines splines (S) between the natural fibres (20). Moreover, splines intertwined in this way are stably retained in the material.

[0022] The following two methods for adding cedar's aromatic component to textile materials have been found to be effective and easy to implement.

[0023] In the first method, splines obtained by pulverizing cedar are layered on the surface of textile materials, which contain a thermoplastic component. Next, heat is applied to soften the surface of the thermoplastic component to fix the splines onto the textile materials. This method is especially effective when the textile material is made of non-woven fabric.

[0024] In the second method, essential oil, purified from cedar, is added to a resin binder. This resin binder is then applied to the textile materials.

[0025] Figure 3 shows a device that fixes cedar splines (S) in fabric (30) during the processing of textile materials.

[0026] The fabric (30) contains a specified amount of a thermoplastic material. Suitable materials include thermoplastic micromolecular fibres including: polyolefin fibres such as polyethylene and polypropylene; polyamide fibres such as 6,6-nylon; vinyl fibres; acrylic fibres; polyurethane fibres; and polyester fibres. Other fibre materials include natural fibres such as cotton and wool, synthetic fibres such as rayon, and mixtures of those fibres.

[0027] While cloth (30) made by compounding such a material is being transported, the cedar splines (S) are supported on the surface. To support the cedar splines (S) on the surface of textile products, a dry method is effective.

[0028] Cedar splines (S) are first dropped from a hopper (41) onto the surface of the transported cloth (30). A blade (42) then evenly distributes the cedar splines along the surface of the cloth (30). Next, a vibrator (43) and pressure roller (44) help implant the cedar splines in between the cloth fibres. Finally, a heater (45) heats the surface of the cloth (30) impregnated with cedar splines. The heat softens the thermoplastic component of the cloth (30), thereby fixing the cedar splines.

[0029] Heating methods that can be used in the heating process include thermal roller heating, hot air heating, and dry heating.

[0030] Depending on the type of thermoplastic component and degree of polymerization of the fibre, the softening point differs. The temperature and duration of the heating process are preferably sufficient to soften at least the surface of the thermoplastic component.

[0031] If several types of thermoplastic component are present, depending on the distribution and ratio of the mixture, the temperature and duration of heating are desirably sufficient to soften the surface of the thermoplastic component having the lowest softening point.

[0032] In an alternative method, the essential oil obtained by purifying cedar so as to contain cedar's aromatic component is added to a resin binder. This binder is then applied to the textile product. Available resin binders include vinyl acetate, acrylic, urethane, and silicone.

[0033] The preferable ratio of binder to essential oil varies from 2:1 to 20:1. If a higher percentage of binder is used, the dispersion effect of the essential oil is diminished. If a lower percentage of binder is used, adhesiveness of the applied oil decreases.

[0034] In order to apply resin binder containing essential oil to a textile product, padding, spraying, coating, and print methods are available.

[0035] Because of the characteristics mentioned above, the present invention has the following effects.

[0036] With natural fibres and textile materials made of such fibres, cedar's essential oil is easily absorbed. Cedar's aroma in the natural fibres effectively imparts a strong insecticidal property to the fibre and also provides a pleasant aromatherapeutic effect, while adding little to the cost of production.

[0037] With synthetic fibres and textile products made of such synthetic fibres, the cedar's essential oil is easily mixed into the synthetic fibres.

[0038] The textile materials in which the present invention can be used include clothing, such as pyjamas, and interior household materials, such as carpets and curtains.

[0039] Cedar has no harmful effect on people and has no offensive odour. Such shortcomings are commonly found with conventional insect-repellent.

[0040] In addition, to its insect-repellent properties, another benefit of using cedar is that it has a pleasant aromatic effect.

[0041] In a preferred embodiment of the invention, the Eastern Red Cedar found in the Appalachian Ozarks region may be used. The tree's aroma can prevent the spread of vermin, which is one of the causes of atopic dermatitis and asthma.

[0042] The vermin-repellent effect of the present invention has been demonstrated as 100% effective, in a vermin evasion test.

[0043] Accordingly, if such an aromatic component of cedar is added to various textile materials, it can easily impart vermin-repellent and aromatherapeutic properties to the materials.

[0044] For example, if fibres containing cedar's aromatic component are used to weave pyjamas, the wearer can enjoy the aromatherapeutic effect. The resulting sound sleep and calm mind induce numerous

physical benefits, including restoration of energy and balancing of the circulatory system.

Claims

1. Fibres additionally comprising the aromatic component of cedar.

2. Fibres according to claim 1, wherein the fibres are naturally-occurring.

3. Fibres according to claim 1, wherein the fibres are synthetic.

4. Fibres according to claim 1 or claim 2, impregnated with said aromatic component of cedar.

5. Fibres according to claim 1 or claim 3, wherein the aromatic component is contained within a hollow section of fibre.

6. Fibres according to any of claims 1 to 3, wherein the aromatic component is a crushed cedar spline, an oil or a powder.

7. A textile material comprising fibres according to any preceding claim.

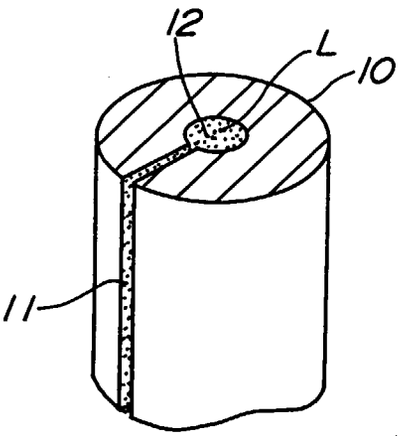
8. A textile material additionally comprising a thermoplastic component with the aromatic component of cedar incorporated therein.

9. A textile material additionally comprising a resin binder comprising the aromatic component of cedar.

10. A method for producing fibres according to any of claims 1, 2 and 4, which comprises impregnating the fibres with an oil comprising the aromatic component of cedar.

11. A method for producing fibres according to any of claims 1, 3 and 5, which comprises adding an oil comprising the aromatic component of cedar into the fibres.

FIG. 1



IG. 2

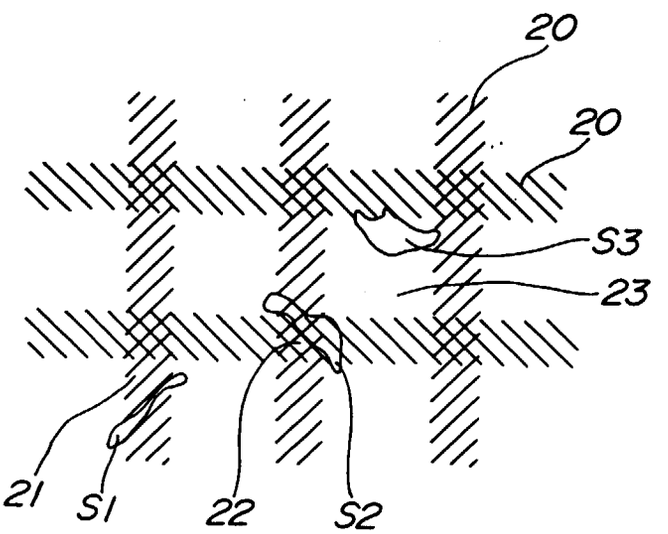


FIG. 3