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(71) Applicant: **Comersan, S.A.**
03820 Concentaina Alicante (ES)

(72) Inventor: **Sanjuan Perez, Jorge**
03820 COCENTAINA (ALICANTE) (ES)

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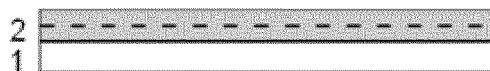
(74) Representative: **Sempere Massa, Iván Luis**
C/Gerona, 15-17, 1^o
03001 Alicante (ES)

(54) **Heatable fabric coating**

(57) Heatable fabric that uses electrical energy as a heat source as a result of the Joule effect, that is the heat produced depends on the resistance of a conductive coating to the passage of an electrical current, for particular application in making clothing and accessories,

also applicable to the household textile industry, for example in mattresses, bed linen, carpets, curtains, decorative coverings for floors and walls, etc, being also applicable for heating floors, walls and ceilings, car interiors, etc., with a high level of user safety.

FIG 1



Description**PURPOSE OF THE INVENTION**

[0001] This invention refers to a heatable fabric that uses electrical energy as a heat source as a result of the Joule effect; that is the heat produced depends on the resistance of a conductive coating to the passage of an electrical current.

[0002] The object of the invention is to achieve a fabric coating with a heatable element for particular application in making clothing and accessories, also applicable to the household textile industry, for example in mattresses, bed linen, carpets, curtains, decorative coverings for floors and walls, etc., being also applicable for heating rooms, walls and ceilings, car interiors, etc.

[0003] A further object of the invention is to achieve a fabric that is heatable by electrical energy and which offers a high level of user safety.

[0004] The invention therefore lies in the field of the textile industry.

BACKGROUND TO THE INVENTION

[0005] The use of electrical energy as a means of obtaining heat by passing an electrical current through a resistance has been known for some time.

[0006] The application of this system for heating textiles is also known, for example the well known "electric blankets" used on beds or as elements for applying heat to specific parts of the user's body.

[0007] Specifically this type of device incorporates a circuit comprising a resistance that is suitably distributed over an inner core so that the resistance is adequately insulated electrically, and then covered by textile on both sides of the circuit.

[0008] Because of this structure, these blankets have a very considerable thickness, reduced flexibility and other problems that make them impossible to be used, for example, to make an article of clothing such as a sweater, the inner lining of shoes, etc.

DESCRIPTION OF THE INVENTION

[0009] The heatable fabric proposed by the invention completely resolves the abovementioned problem and the aspects mentioned.

[0010] This is done more specifically and in accordance with one of the characteristics of the invention, in that the electrical circuit constituting the heat source is comprised of a coating on the fabric in question.

[0011] More specifically, the idea is for the textile article, of any size or shape, to incorporate a couple of electrodes whose function is to transport electricity without loss, while the fabric is coated with a semiconductor resin that connects the said electrodes; this resin being the means to generate heat.

[0012] In any case the result is a circuit of resistances

in series and parallel that generates the heat required for the different applications.

[0013] The conducting electrodes may be comprised of strips made of copper, silver, etc., whereas the semi-conducting resin is formulated with a percentage of graphite, carbon, steel, etc. powder.

[0014] A perfect union between the conducting strips and the fabric coating of semiconducting resin is assured by sewing the conducting strip to the fabric coated with the semiconducting resin using a special thread and then applying a laminate using temperature and pressure on an thermal adhesive tape placed over the conducting strip, thus preventing any electrical loss due to false contacts.

[0015] Perfect electrical insulation of the assembly is assured by laminating both sides of the coated fabric, including the semiconducting resin and its two electrodes, with a perfectly sealed plastic material.

[0016] In accordance with another of the characteristics of the invention the circuit integrated in the heatable fabric may be connected to a 230-240 volt power supply, etc, with suitable safety insulation.

[0017] In accordance with another of the characteristics of the invention and for supplying power to the said electrical-heater circuit, a very low voltage source may also be used, for example 12 volts, thus avoiding, on the one hand, the problem of possible electric shock that could injure the user, providing adequate safety insulation and furthermore this very low voltage, in conjunction with the use of direct current, enables providing power to the fabric using a battery, thus giving the user complete independence when the fabric forms part of an article of clothing or similar.

DESCRIPTION OF THE DRAWINGS

[0018] In addition to the description provided here and in order to aid in a better understanding of the characteristics of the invention, and in accordance with one preferred example of a practical embodiment, an integral part of this description is a set of drawings where, in an illustrative and not limiting sense, the following is shown:

Figure 1. Shows an enlarged schematic, cross-sectional representation of the fabric with the semiconductor coating included in the structure of the fabric to simplify its flexibility in accordance with the object of the present invention.

Figure 2. Shows a plan view of the fabric with its semiconductor coating and electrodes located at the edges.

Figure 3. Shows a cross-section detail of the laminate for electrical insulation.

PREFERRED EMBODIMENT OF THE INVENTION

[0019] In these figures it is possible to observe how a heatable fabric manufactured in accordance with the object of this invention is a conventional fabric (1) coated with a semiconducting resin on its whole width and length (2), which is inserted into the structure of the fabric, thus conserving its flexibility.

[0020] In accordance with the invention, the conducting strips (4, 4') form the electrodes located at the edges and will be used for connection to the power supply, not shown.

[0021] For its part, in regard to the semiconductor coating (2), specifically with some of them in the case of figure 1, they incorporate a certain percentage of particles of graphite, carbon, steel, etc.

[0022] The connection between the semiconductor coating (2) and the electrodes (4, 4') is made by means of contact as shown in figure 2.

[0023] The plastic insulation (6, 6') is placed on both sides, covering the assembly comprised of the fabric coated with the semiconductor layer together with the two electrodes (5), to ensure they are electrically insulated.

[0024] In accordance with one example of a practical embodiment, this plastic insulation may be comprised of a coating of synthetic resins depending on the voltage, for more or less insulating power, for example for 12 volts the same plastic insulation would not be used as for 230 volts; 12 volt insulation would be possible with the synthetic coating.

[0025] In accordance with one example of a practical embodiment, depending on the coating applied and the power supply, it is possible to obtain more or less heating power per square metre.

Claims

1. Heatable fabric, using electrical energy as a heat source, making it pass through a resistance, **characterised in that** the electrodes are electrical power supply strips (4, 4') and the resistance is a coating of semiconducting resin (2) forming part of the fabric (1).
2. Heatable fabric, according to claim 1, **characterised in that** the strips of electrodes (4, 4') are located along the edges or selvedge of the textile article to ensure a perfect union between the conducting strips and the fabric coated with the semiconducting resin, the conducting strip is sewn with a special thread to the fabric coated with the semiconducting resin and then laminate is applied with temperature and pressure to a thermal adhesive tape over the conducting strip, thus preventing any electrical loss due to false contacts affecting the whole coating of semiconducting resin. These strips are made of copper, silver or

any other good electrical conductor.

3. Heatable fabric, according to the above claims, **characterised in that** the coating of semiconducting resin (2) spread evenly over the whole surface of the textile article (3), or on one part thereof, is formulated with a percentage of graphite, carbon, steel, etc. powder.
4. Heatable fabric, according to the above claims, **characterised in that** the conducting strips (4, 4') converge at each selvedge (4) to form a common cable for connection to the power supply.
5. Heatable fabric, according to the above claims, **characterised in that** the coating of semiconducting resin (2), with a percentage of graphite, steel, carbon or other resistant material, intersects with the conducting strips (4, 4') constituting the electrodes, in such a way that a correct electrical connection between the fabric coating 3 and the conducting strip (4, 4') is assured.
6. Heatable fabric, according to the above claims, **characterised in that** the power supply to the electrodes is a very low voltage source, optionally a battery.
7. Heatable fabric, according to the above claims, **characterised in that** the power supply to the electrodes may be the 230-240 volt power supply network.
8. Heatable fabric, according to the above claims, that may be integrated by construction or lamination and used in mattresses, bed linen, carpets, curtains, decorative floor and wall coverings, etc., being also applicable for heating floors, walls and ceilings, car interiors, etc.

FIG 1

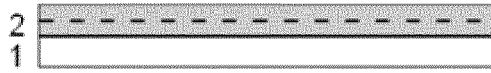


FIG 2

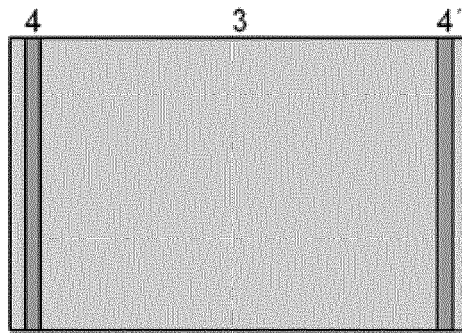
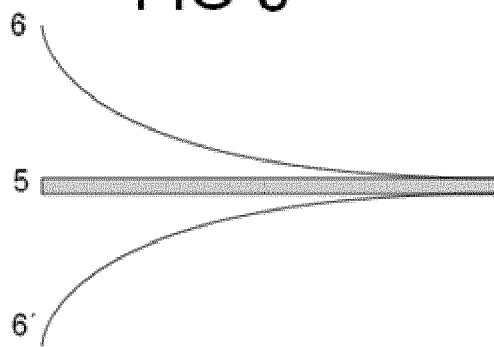


FIG 3





EUROPEAN SEARCH REPORT

Application Number
EP 12 16 7686

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search Munich		Date of completion of the search 17 September 2012	Examiner Debre, Angela
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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