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(54) **IMPROVEMENTS MADE TO PATENT NO. P-200702449 FOR: A THREAD FOR FABRIC WITH ELECTROMAGNETIC WAVE ATTENUATION AND INSULATION PROPERTIES**

(57) The improvements relate to a thread (1) with an aluminium core (2) and a textile covering (3), the aluminium core (2) having a diameter of 51 to 1000 micrometres. Another improvement consists of said thread (1) being used as a covering for a textile fibre (4), of any length, for forming a rope (5) which can be used in the formation of fabrics for forming screened meshes for the insulation from electromagnetic waves in buildings.

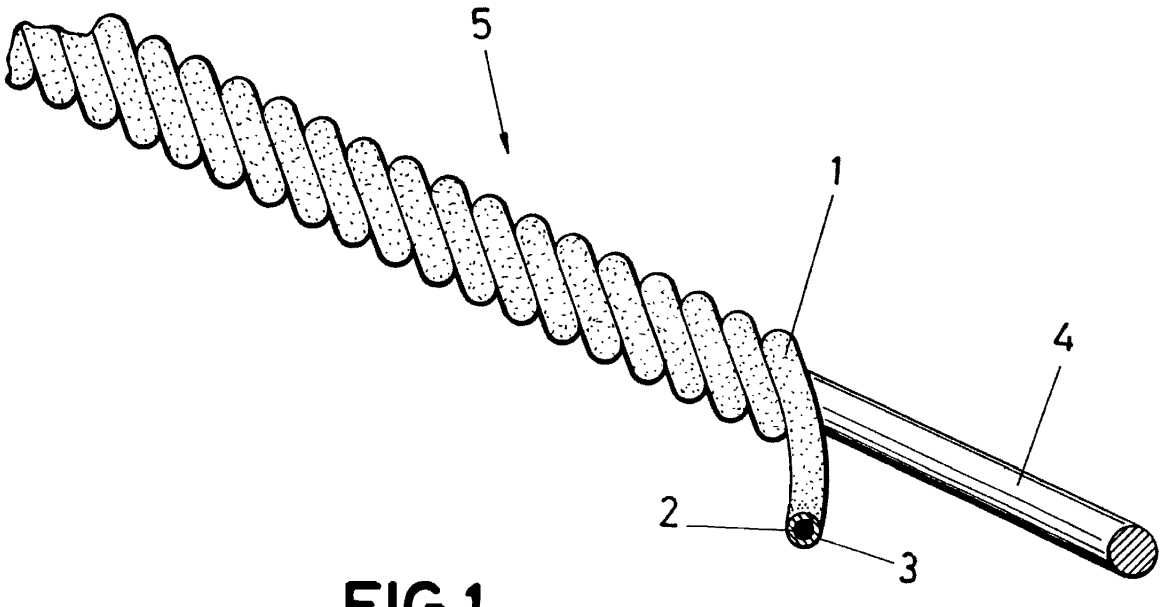


FIG.1

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Description

OBJECT OF THE INVENTION

[0001] The present invention, as it is stated in the title of this specification, relates to improvements made to the object of the patent of invention no. 200702449, which describes a thread for fabric with attenuation and insulation capabilities against electromagnetic waves, applicable preferentially and mainly in the construction of apparel items, civil, military and industrial, as well as for coatings that have as an objective to attenuate and isolate electromagnetic waves.

[0002] The object of the invention is to achieve an optimal resistance of the thread and to be able to use it to make a fabric that allows, not only attenuating and isolating the human being from radio frequency radiation that is undergoing daily, but also to make fabrics capable of forming an electromagnetic waves insulating element in buildings.

BACKGROUND OF THE INVENTION

[0003] As it is known, due to technological developments, the human being is daily undergoing constant electromagnetic radiation due to the radio frequency waves that are created by mobile phones, appliances, scanners, radars, relays of all types of signals, safety devices, frequency inhibitors, alarms, satellites, aerial and underground electric wiring, etc., i.e. any emitter of radio waves, either by its own motivation, either by emissions that accompany its functioning, causing as primary effect a warming of the elements they cross due to the dispersal of its energy, as it is the case of the human body, and that has caused social alarm because of the possible diseases of all kinds, as well as psychical and physical alterations these can produce.

[0004] Thus, the Patent of Invention No. 200702449, describes a thread for fabrics with attenuation and insulation capabilities against electromagnetic waves, where the fabrics are likely to be used for manufacture of apparel items or industrial fabrics that allow to isolate, partially or totally, the user or objects from the radiation to which they are subjected nowadays, as a result of the electric and electronic technologies used for multiple purposes in society.

[0005] Specifically, the thread for fabric with attenuation and insulation capabilities against electromagnetic waves described in this main Patent of Invention, is comprised of an aluminum core or any material that has the same features at the level of attenuation and insulation of electromagnetic waves, and a textile coating which can be made of: cotton, silk, viscose, viscose FR (flame retardant), acrylic, methacrylic, wool, wool FR, melamine, polypropylene, polyethylene, ultra high molecular weight polyethylene, low density polyethylene, high density polyethylene, high density polyethylene polyamide, polyamide HT, fire retardant polyamide, polyester, polyester HT, fire-retardant polyester, polyester copolymers, aromatic polyamides (meta-aramid and para-aramid) and their copolymers (copolyaramid), polyacrylonitrile, polybenzimidazole, polyphenylene 2,6-benzobisoxazole, polyphenylene terathalamid, polyvinyl, polyamide, polyetherimide, polyamideimide, polymethaphenilene isophthalamide and all their combinations and mixtures of them, where the aluminum core will have a section in line with the thickness of the coating, and said core can even be constituted through a mixture of aluminum with other materials, provided that the characteristics of attenuation and isolation from electromagnetic waves are maintained.

[0006] For its part, the coating of the materials listed above will be based on braided or even twisted sub-threads, being able to use as a coating any other type of natural or synthetic thread, as present in the market, current or future.

[0007] Likewise, it is worth highlighting that the rope formed by the braided or twisted sub-threads, constituting the coating of the aluminum core, can be monofilament or multifilament, and intervenes in a number of three, four or five to form the coating in each case.

[0008] Ultimately, the thread for fabric with attenuation and insulation capabilities against electromagnetic waves envisaged in that main Patent of Invention, is based on adhering, by any physical or chemical process, a coating on an aluminum core or mixture of it with other appropriate materials, where the coating can be of any type of fiber, allowing the finished spinning to cross creating weft and warp to ultimately configure a fabric that allows the manufacture of apparel items or industrial fabrics, which will enable to partially or totally isolate the user or element from radio frequency electromagnetic radiation to which it is constantly subjected, and solving with it, or at least alleviating in good part, the exposure to said electromagnetic waves and thereby the consequences or possible consequences thereof.

[0009] It has been shown that the aluminum core referred to can break in the coating phase, when being subjected to tension by the respective machine.

DESCRIPTION OF THE INVENTION

[0010] The improvements introduced in the main Patent of Invention referred to in the preceding paragraph, focuses on two fundamental aspects:

1.- Using the thread of the Patent of Invention to form a fabric applicable in construction, specifically as an insulator of electromagnetic waves in buildings, having been planned that said thread with aluminum core and textile coating is applied as a coating of a textile fiber, it being either short or long, in a surrounding spiral manner, all along the fiber, covering all of it, or using two or more threads arranged braided or twisted on the own textile fiber, also in a surrounding manner covering all of its surface. The tex-

tile fiber of the coating can be materialized in fiberglass.

The attachment of the thread to the textile fiber shall be by any appropriate process or procedure.

2.- Including an aluminum core or mixture of it with other materials, with a diameter comprised between 51 and 1000 microns, the diameter varying between those values depending on the application of the thread itself, depending on whether it is applied in the formation of fabrics for apparel items or the formation of fabrics intended for constituting shielding meshes in construction or other uses and/or applications. In the case of using mixture of aluminum and other materials, the first will intervene on a percentage equal to or greater than 50%.

[0011] Based on the range of thickness or diameter referred to for the aluminum core of the thread, a certain mechanical strength according to the different applications is ensured.

[0012] Finally, say that the frequency range to be attenuated will be preferably comprised between 800 Hz and 12 GHz.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] To complement the description that will be carried out in the following and with the object of helping to a better understanding of the features of the invention, the present specification is accompanied by a set of drawings based on which the innovations and advantages of the improvements object of the invention will be more easily understood.

Figure 1.- Shows a perspective view of a rope formed by a textile fiber core and a coating thread provided with an aluminum core with a textile coating, all of it carried out in accordance with the object of the invention.

Figure 2.- Shows a perspective view of a rope formed by a textile fiber core and a coating thread provided with an aluminum core with two twisted coating threads.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] As it can be seen in the figures referred to above, and specifically in figure 1, a thread **1** for fabric with isolating attenuating capabilities against electromagnetic waves and provided with an aluminum core **2** and a textile coating **3,** is applied as a coating for a textile fiber **4** to obtain a thread **5** usable in the manufacture of fabrics or shielding meshes against electromagnetic waves in buildings.

[0015] The aluminum core **2** will be constituted by a filament the section of which shall be comprised between 51 and 1000 microns, while the textile coating **3** of said core **2** shall consist of sub-threads which can be braided or twisted in a surrounding manner on the core **2.**

[0016] The textile fiber **4** on which the thread **1** is applied in a surrounding manner, may be short or long, and the implementation of such thread can be single spiral-shaped as shown in figure 1, to obtain a rope **5,** or else using two threads **1** arranged braided as depicted in figure 2, to obtain a rope **5'.**

[0017] As it has been said, the aluminum core **2** of the thread **1,** rather than a strand of pure aluminum, can be made up of a mixture with other metallic materials, provided that these do not exceed 50% of the total of the composition of the aluminum core **2,** allowing obtaining fabrics with the maximum performance.

[0018] For its part, the coating **3** can be formed by braided or twisted threads, with simple or multiple fibers, and rather than being made of any of the materials referred to in the "background of the invention section" they may be or also be constituted on the basis of other textile materials, i.e., any other type of spinning, both natural and synthetic.

Claims

1. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties, the thread (1) being formed by an aluminum core (2) or mixture of it with other materials and a textile coating (3), natural or synthetic, based on twisted sub-threads, **characterized in that** the core (2) of the thread (1) has a diameter comprised between 51 and 1000 microns.

2. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties according to claim 1, **characterized in that** the aluminum core (1) mixed with other materials comprises at least 50% of pure aluminum.

3. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties according to claim 1, **characterized in that** the thread (1) with its aluminum core (2) and textile coating (3), is applied and fixed as a coating of a textile fiber (4) to form a rope (5 or 5') usable in the manufacture of fabrics for shielding meshes for insulation against electromagnetic waves in buildings.

4. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties according to claim 3, **characterized in that** the thread (1) with its aluminum core (2) and textile coating (3), is applied and fixed in a unitary way in spiral and in a surrounding manner on the textile fiber (4), forming a rope (5).

5. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties according to claim 3, **characterized in that** the thread (1) with its aluminum core (2) and textile coating (3), is applied and fixed jointly with one or more other threads (1) in a braided arrangement on the textile fiber (4), forming a rope (5').

6. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties according to any of the previous claims, **characterized in that** the textile coating (3) is made of fiberglass.

7. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties according to previous claims, **characterized in that** the textile fiber (4) is short.

8. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties according to claims 1 to 5, **characterized in that** the textile fiber (4) is long.

9. Improvements made to the patent no. P-200702449 for: a thread for fabric with electromagnetic wave attenuation and insulation properties according to previous claims, **characterized in that** the frequency range to be attenuated is comprised between 800 Hz and 12 GHz.

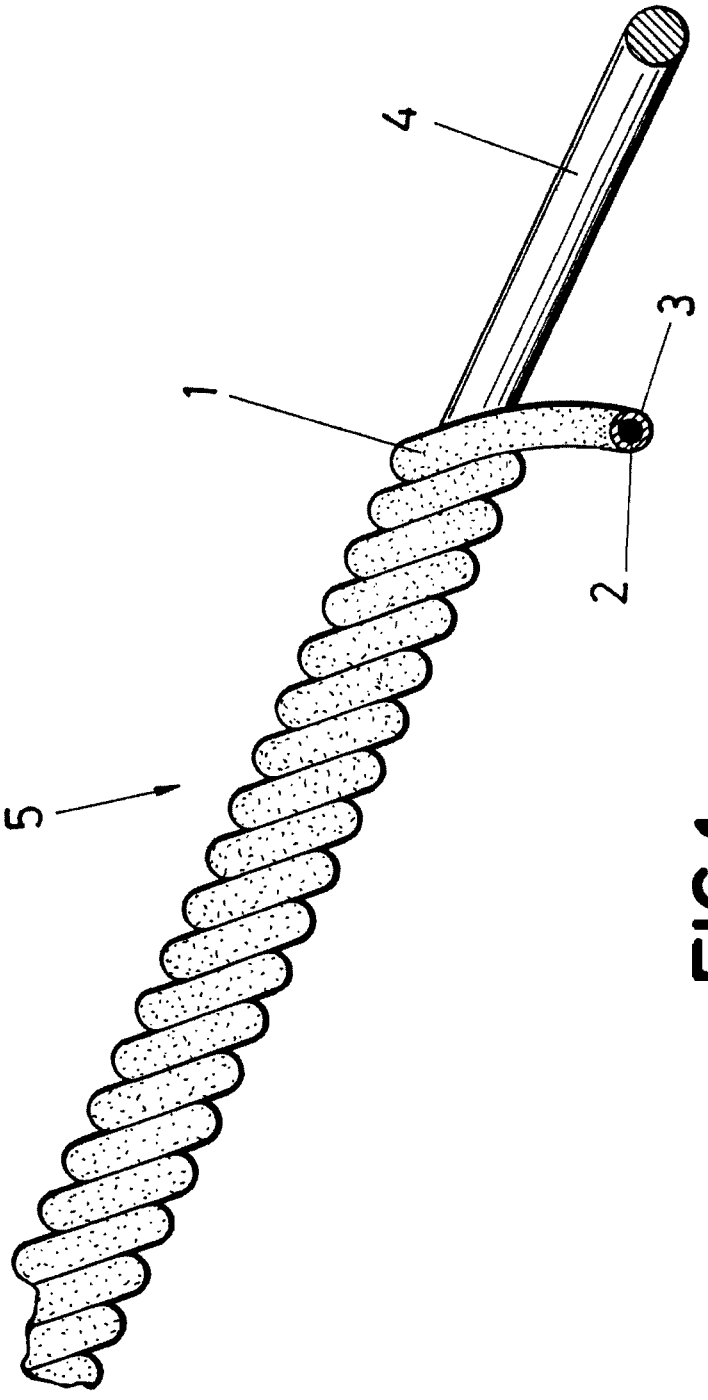


FIG.1

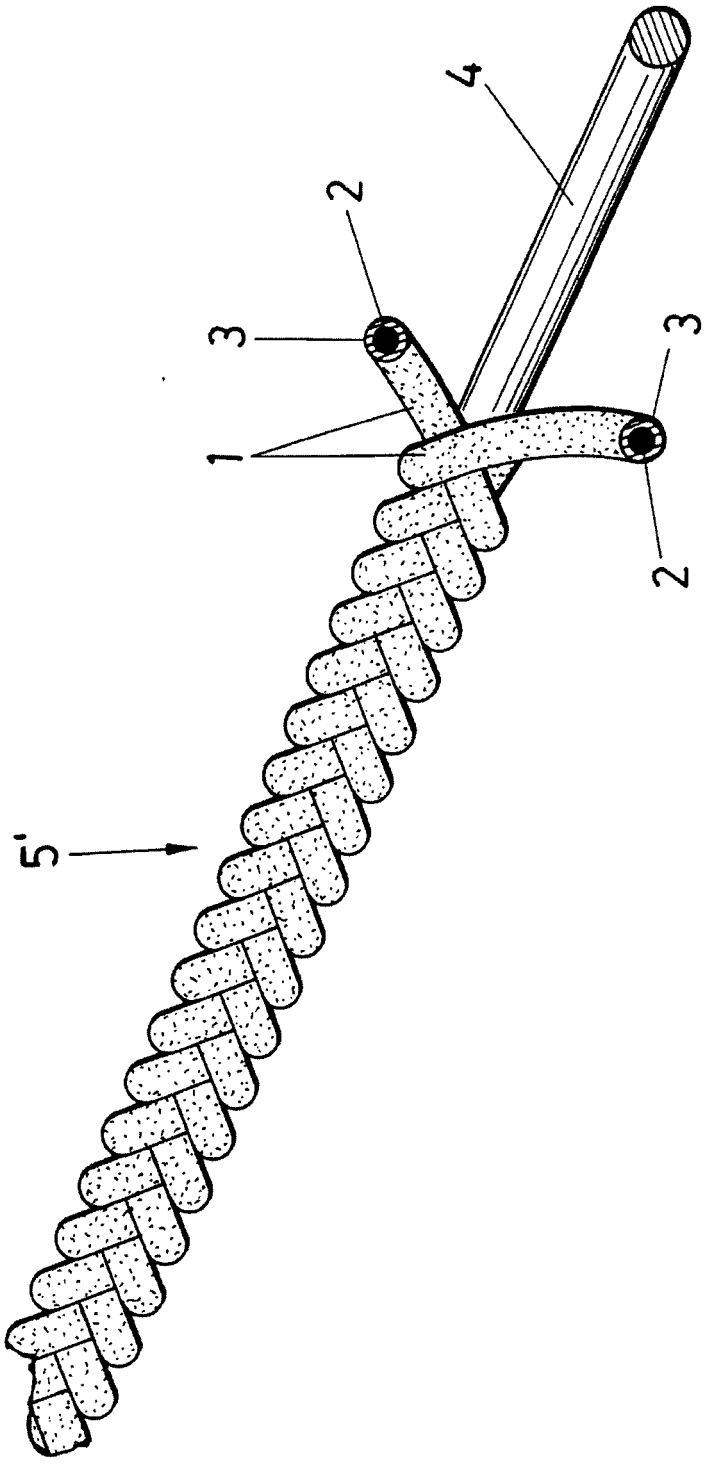


FIG.2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2010/070249

A. CLASSIFICATION OF SUBJECT MATTER

see extra sheet
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D02G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

INVENES,EPODOC,WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 644283 B1 (INDUSTRIE TESSILI AVIANESI) 28.10.1998, claims 1, 3, 8, 14; column 5, lin. 47-50	1-7
X	WO 2009034212 A1 (HILATURA CIENTIFICA) 19.03.2009, abstract; claims; page 4, line 24	1-7
A	US 5809861 A (WHIZARD PROTECTIVE WEAR CORP.) 22.09.1998, figure 1	1-7

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure use, exhibition, or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 July 2010 (29.07.2010)	**(03/08/2010)**
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304	Authorized officer M. Ojanguren Fernández Telephone No. +34 91 349 84 68

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ ES 2010/070249

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
WO 2009034212 A	19.03.2009	ES 2315199 AB	16.03.2009
		EP 2206812 A	14.07.2010
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		DK 644283 T	12.07.1999
US 5809861 A	22.09.1998	NONE	----------

Form PCT/ISA/210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ ES 2010/070249

CLASSIFICATION OF SUBJECT MATTER

D02G 3/12 (2006.01)
D02G 3/36 (2006.01)

Form PCT/ISA/210 (extra sheeet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 200702449 A **[0001] [0004]**