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(54) **STERILE KNITTED FABRIC AND METHOD FOR MANUFACTURING THE SAME**

(57) A sterile knitted fabric is provided. The sterile knitted fabric is made by the following steps: First, a plurality of nano far infrared antibacterial yarns (121) and a plurality of bamboo charcoal hollow yarns (123) are provided. Next, the nano far infrared antibacterial yarns (121) are interwoven with the bamboo charcoal hollow

yarn (123) by a circular knitting machine to form a grey fabric. Next, the grey fabric is passed through a scouring process to form a scoured fabric. Next, the scoured fabric is passed through a setting process. The scoured fabric is moved with a speed of 25 meters per minute for the setting process.

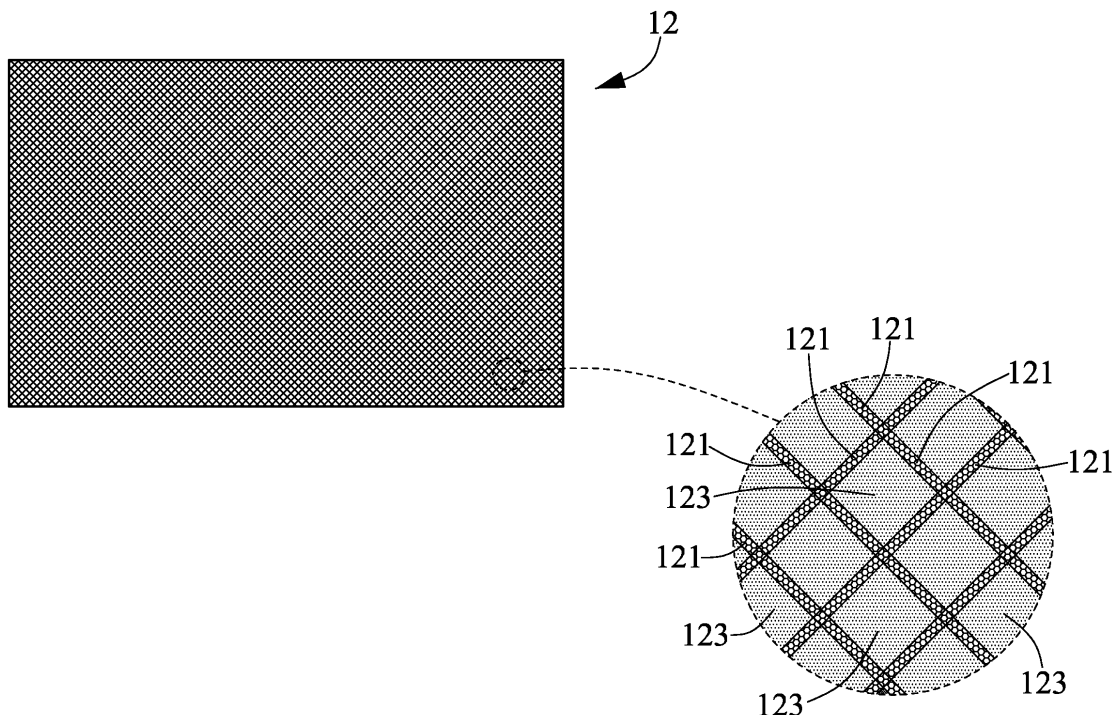


FIG. 2

Description

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates to a sterile knitted fabric and method for manufacturing the same, and more particularly to the sterile knitted fabric and method for manufacturing the same including two different spinning materials.

BACKGROUND OF THE INVENTION

[0002] Nano silver ions in nano silver nano far infrared antibacterial yarn can block viruses and inhibit alien organisms that are harmful to the human body. Furthermore, the nano silver ions can also continuously release negative ions and far-red energy, which can effectively increase blood circulation and promote metabolism. In addition, the fiber of the nano silver ions is a single entity formed by the aggregation of silver and fiber, so silver and fiber cannot be stripped. Thus, the antibacterial effect of nano silver nano far infrared antibacterial yarn is very long-lasting, and it is not easy to decrease with time. A knitted fabric including the nano silver nano far infrared antibacterial yarn is often used as the inner layer of the mask. However, when the knitted fabric including the nano silver nano far infrared antibacterial yarn touches the skin of the wearer, the skin of the wearer would feel unwell. Thus, the mask cannot be worn for a long time.

[0003] Therefore, how to manufacture a sterile knitted fabric that is comfortable to wear with antibacterial effect is worth considering for person having ordinary skill in the art.

SUMMARY OF THE INVENTION

[0004] The objective of the present invention is to provide a method for manufacturing a sterile knitted fabric. The knitted fabric produced by the method for manufacturing a sterile knitted fabric can inhibit germs. Besides, the sterilized knitted fabric as the inner layer of the mask can improve the comfort of wearing.

[0005] The method for manufacturing the sterile knitted fabric of the present disclosure has: First, a plurality of nano far infrared antibacterial yarns and a plurality of bamboo charcoal hollow yarns are provided. Next, the nano far infrared antibacterial yarns are interwoven with the bamboo charcoal hollow yarn by a circular knitting machine to form a grey fabric. Next, the grey fabric is through a scouring process to form a scoured fabric. Next, the scoured fabric is through a setting process. The scoured fabric is moved 25 meters per minute for the setting process.

[0006] In the method for manufacturing the sterile knitted fabric, an ironing temperature range of the setting process is 160°C~180°C.

[0007] In the method for manufacturing the sterile knitted fabric, the ironing temperature is 170°C.

[0008] In the method for manufacturing the sterile knitted fabric, the scouring process is configured to remove impurities of the grey fabric.

[0009] In the method for manufacturing the sterile knitted fabric, a scouring temperature of the scouring process is 130°C.

[0010] In the method for manufacturing the sterile knitted fabric, the nano far infrared antibacterial yarns are interwoven with the bamboo charcoal hollow yarn by a circular knitting machine to form a grey fabric.

[0011] In the method for manufacturing the sterile knitted fabric, an antibacterial agent and a bridging agent are added to the scoured fabric before the setting process.

[0012] In the method for manufacturing the sterile knitted fabric, the nano far infrared antibacterial yarns have a plurality of silver ions.

[0013] Another objective of the present is to provide a sterile knitted fabric. The sterile knitted fabric can inhibit germs. Besides, the sterilized knitted fabric as the inner layer of the mask can improve the comfort of wearing.

[0014] The sterile knitted fabric of the present invention made by a method has the following steps: a plurality of nano far infrared antibacterial yarns and a plurality of bamboo charcoal hollow yarns are provided; the nano far infrared antibacterial yarns are interwoven with the bamboo charcoal hollow yarn by a circular knitting machine to form a grey fabric; the grey fabric is through a scouring process to form a scoured fabric; and, the scoured fabric is through a setting process, wherein the scoured fabric is moved 25 meters per minute for the setting process.

[0015] Aforesaid sterile knitted fabric, the bamboo charcoal hollow yarn in the grey fabric is arranged in a checkerboard pattern.

[0016] The foregoing, as well as additional objects, features and advantages of the invention will be more readily apparent from the following detailed description, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Fig. 1 illustrates a flow chart of a method 10 for manufacturing a sterile knitted fabric.

Fig. 2 illustrates a partial enlarged view of a grey fabric 12.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] Please refer to Fig. 1, which illustrates a flow chart of a method 10 for manufacturing a sterile knitted fabric. The sterilized knitted fabric is as the inner layer of the mask. It is the material that is in direct contact with the wearer's face. The method 10 for manufacturing a sterile knitted fabric includes the following steps:

First, please refer to the step S1. A plurality of nano far infrared antibacterial yarns 121 and a plurality of bamboo charcoal hollow yarns 123 are provided. The nano far infrared antibacterial yarn has a plurality of silver ions. The content of the silver ions is 0.8%~1% of the entire nano far infrared antibacterial yarn. Therefore, the nano far infrared antibacterial yarn 121 can continuously release negative ions and far infrared radiations, and the antibacterial effect of the nano far infrared antibacterial yarn 121 is also excellent. Furthermore, the bamboo charcoal hollow yarns 123 can deodorize, regulate moisture, and adsorb chemicals. The air permeability of bamboo charcoal hollow yarns 123 is outstanding as well.

[0019] Please refer to the step S2 and Fig. 2. Fig. 2 illustrates a partial enlarged view of a grey fabric 12. The nano far infrared antibacterial yarns 121 and the bamboo charcoal hollow yarn 123 are interwoven to form a grey fabric 12. In detail, the nano far infrared antibacterial yarns 121 are interwoven with the bamboo charcoal hollow yarn 123 by a circular knitting machine (not shown in figure) to form a grey fabric 12 in this method. In addition, the bamboo charcoal hollow yarn 123 knitted is arranged in a checkerboard pattern, and the nano far infrared antibacterial yarn 121 knitted is surrounded by the bamboo charcoal hollow yarn 123. The diameter of the circular knitting machine is 34 inches, and its needle cylinder includes 24 needles per inch.

[0020] Please refer to the step S3. The grey fabric 12 is through a scouring process to form a scoured fabric (not shown in figure). A scouring temperature range of the scouring process is 120°C~140°C, and the preferred refining temperature is 130°C. In detail, before dyeing processes, impurities in the grey fabric 12, such as gum, wax, grease, need to be removed. This task is called "scouring". The grey fabric 12 scoured can improve the purity of cellulose and increase the whiteness of the fabric to achieve a good dyeing effect.

[0021] With reference to the step S4, the scoured fabric is through a dyeing process to dye the scoured fabric. The scouring process and the dyeing process take about 1.5 hours.

[0022] In the step S5, the scoured fabric is through a setting process. In setting process, a setting machine is used to iron the scoured fabric at high temperature to form the sterile knitted fabric. For example, the setting machine is Chengfu 9-chamber setting machine. An ironing temperature range of the setting process is 160°C~180°C, and the preferred ironing temperature is 170°C. It is to be noted that the melting point of the bamboo charcoal hollow yarn 123 is 130°C, which is less than the ironing temperature. Therefore, the scoured fabric need to be moved 25 meters per minute for the setting process to prevent the bamboo charcoal hollow yarn 123 from breaking after being heated. Specifically, the scoured fabric will be passed through the 8-section oven of the setting machine within 1 minute (the Chengfu 9-chamber setting machine includes a total of 9 ovens). Thus, the scoured fabric is always moving during the set-

ting process, not static. Each part of the scoured fabric can be ironed at high temperature in a short time, so the bamboo charcoal hollow yarn 123 in the sterilized knitted fabric ironed will not have the problem of yarn breakage.

[0023] Because only half of the tissue of the sterilized knitted fabric is nano far infrared antibacterial yarns 121, the antibacterial effect of the sterilized knitted fabric will be slightly inferior to the antibacterial effect of a knitted fabric made of only nano far infrared antibacterial yarn 121. In order to enhance the antibacterial effect of the sterilized knitted fabric, an antibacterial agent will be added to the scoured fabric before the above setting process. The model of the antibacterial agent is, for example, MICROBAN® ZO6 R30700-480, and its main component is zinc ion. As a result, the effects of antibacterial, anti-mold and anti-odor can be increased without changing the original functions of the scoured fabric. In addition to adding the antibacterial agent, the scoured fabric will also add a bridging agent. The bridging agent can improve the weather resistance, solvent resistance, and corrosion resistance of the scoured fabric.

[0024] Compared to the knitted fabric made of only nano far infrared antibacterial yarn 121, in addition to antibacterial effects, the sterilized knitted fabric manufactured by the method 10 for manufacturing the sterile knitted fabric also includes the effects of deodorization, ventilation, and moisture absorption. Besides, when the sterilized knitted fabric is made into a mask, the checkerboard shape bamboo charcoal hollow yarn 123 can improve the comfort of wearing.

[0025] Although the description above contains many specifics, these are merely provided to illustrate the invention and should not be construed as limitations of the invention's scope. Thus, it will be apparent to those skilled, in the art that various modifications and variations can be made in the system and processes of the present disclosure without departing from the spirit or scope of the invention.

Claims

1. A method for manufacturing a sterile knitted fabric comprising:

- (A) providing a plurality of nano far infrared antibacterial yarns and a plurality of bamboo charcoal hollow yarns;
- (B) interweaving the nano far infrared antibacterial yarns and the bamboo charcoal hollow yarn to form a grey fabric;
- (C) making the grey fabric through a scouring process to form a scoured fabric; and
- (D) making the scoured fabric through a setting process;

wherein the scoured fabric is moved 25 meters per minute for the setting process.

2. The method for manufacturing the sterile knitted fabric of claim 1, wherein an ironing temperature range of the setting process is 160°C~180°C.
3. The method for manufacturing the sterile knitted fabric of claim 2, wherein the ironing temperature is 170°C. 5
4. The method for manufacturing the sterile knitted fabric of claim 1, wherein the scouring process is configured to remove impurities of the grey fabric. 10
5. The method for manufacturing the sterile knitted fabric of claim 1, wherein a scouring temperature of the scouring process is 130°C. 15
6. The method for manufacturing the sterile knitted fabric of claim 1, wherein the nano far infrared antibacterial yarns are interwoven with the bamboo charcoal hollow yarn by a circular knitting machine in the step (B). 20
7. The method for manufacturing the sterile knitted fabric of claim 1, wherein an antibacterial agent and a bridging agent are added to the scoured fabric before the setting process. 25
8. The method for manufacturing the sterile knitted fabric of claim 1, wherein the bamboo charcoal hollow yarn in the grey fabric is arranged in a checkerboard pattern. 30
9. A sterile knitted fabric is made by a method including the following steps: 35
 - (A) providing a plurality of nano far infrared antibacterial yarns and a plurality of bamboo charcoal hollow yarns;
 - (B) interweaving the nano far infrared antibacterial yarns and the bamboo charcoal hollow yarn to form a grey fabric; 40
 - (C) making the grey fabric through a scouring process to form a scoured fabric; and
 - (D) making the scoured fabric through a setting process; 45

wherein the scoured fabric is moved 25 meters per minute for the setting process.
10. The sterile knitted fabric of claim 1, wherein the bamboo charcoal hollow yarn in the grey fabric is arranged in a checkerboard pattern. 50

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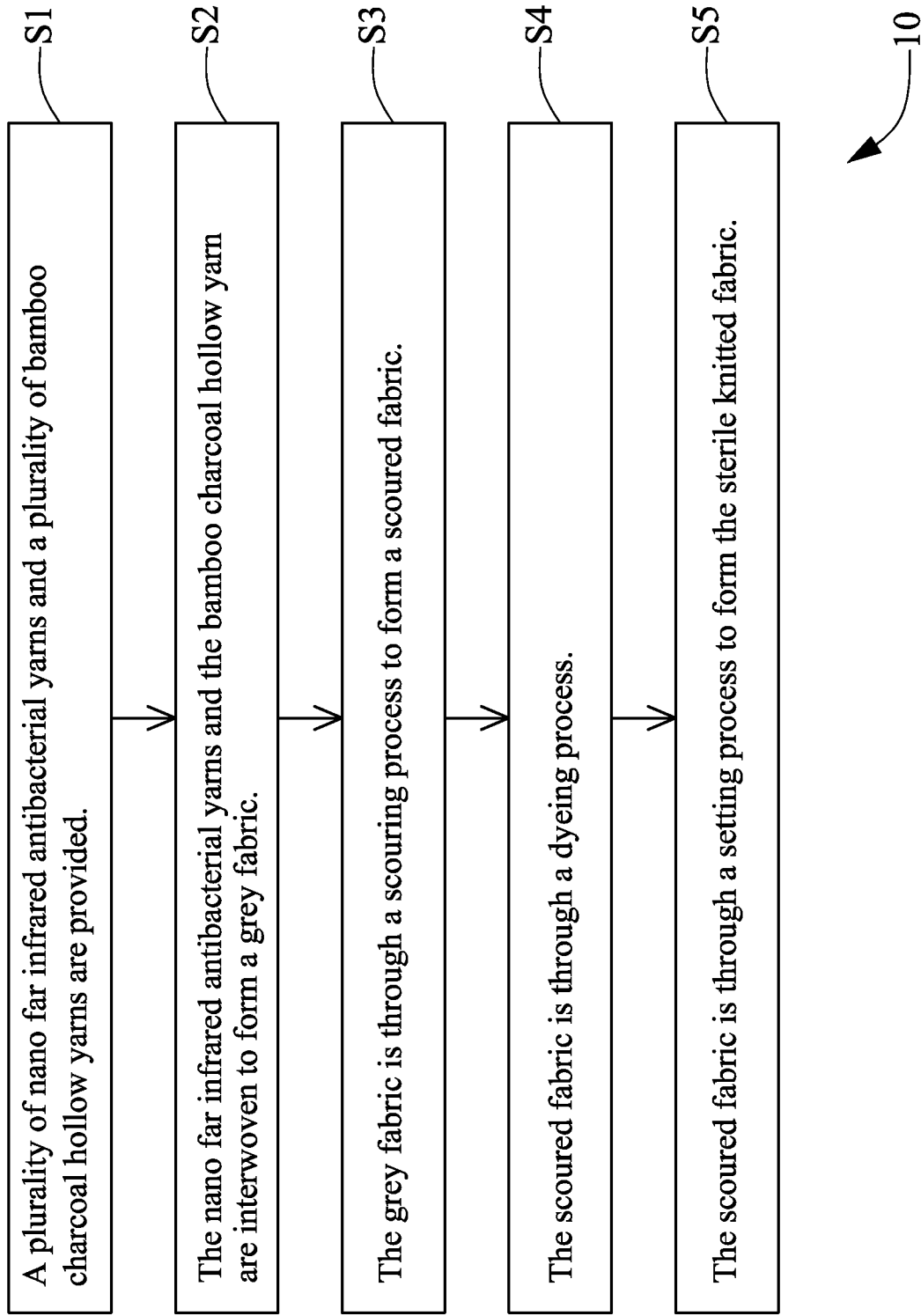


FIG. 1

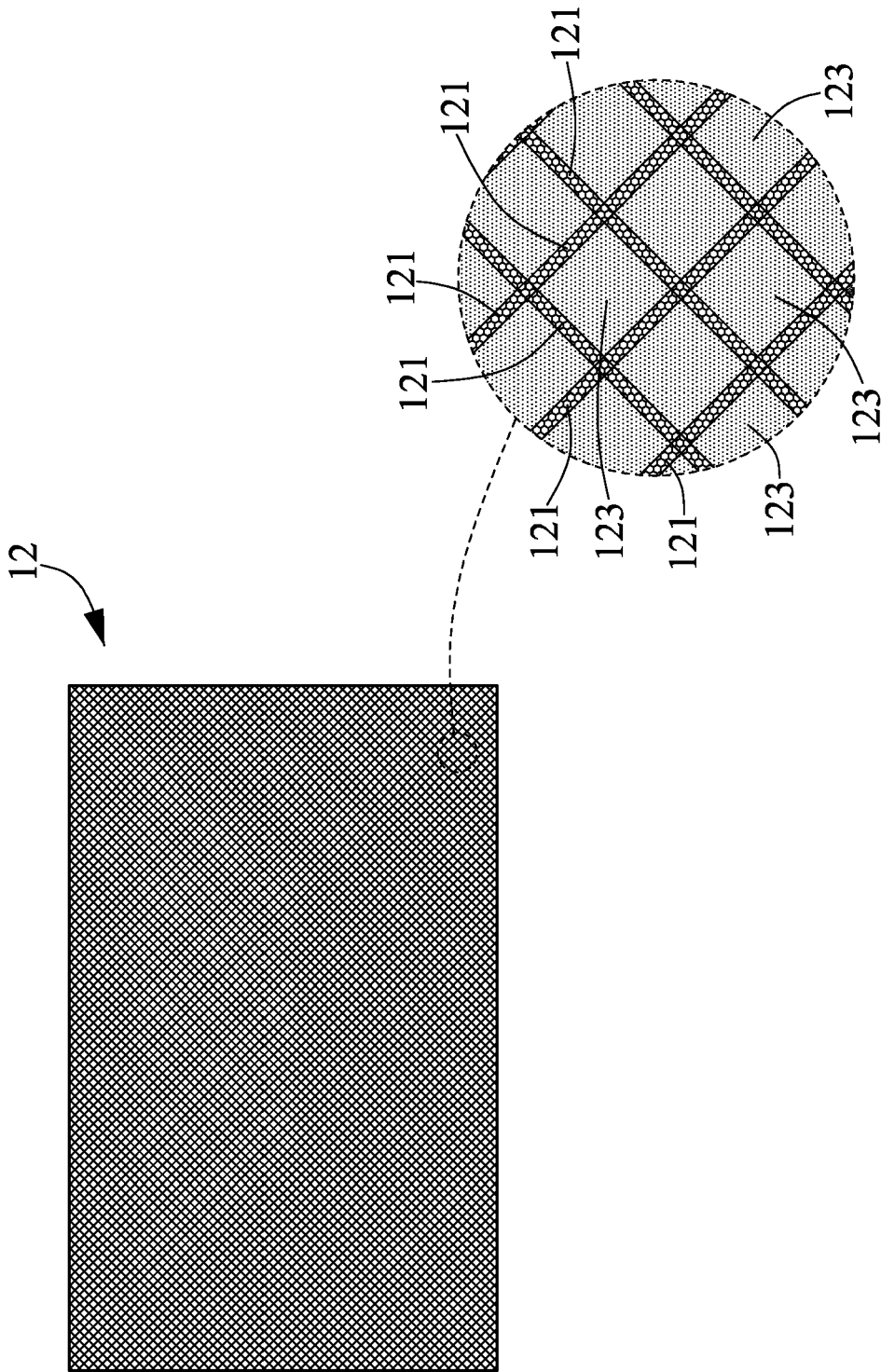


FIG. 2



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 19 5974

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EPO FORM 1503 03.02 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 202 849 700 U (SHANGHAI MAOTENG KNITTING & WEAVING CO LTD) 3 April 2013 (2013-04-03)	9	INV. D04B1/12
Y	* paragraphs [0021] - [0031]; claim 1;	10	
A	figure 1 *	1-8	
Y	EP 2 492 390 A1 (TEIJIN FIBERS LTD [JP]) 29 August 2012 (2012-08-29)	10	
A	* paragraphs [0001], [0081], [0085], [0094], [0153]; claim 20; figures 1-3; example 7 *	1,6,8	
A	WO 2018/085061 A1 (BRRR! INC [US]) 11 May 2018 (2018-05-11)	1,9	TECHNICAL FIELDS SEARCHED (IPC) D04B
A	* paragraphs [0043], [0044], [0050], [0064] - [0066], [0075], [0076], [0089]; claims 3, 5, 6; figures 2, 9-25 *		
A	CN 109 463 819 A (UNIV NATIONAL DONG HWA) 15 March 2019 (2019-03-15)	9	
	* paragraphs [0072], [0084], [0090], [0102]; claim 2; figures 1-2; examples 3, 5, 6, 8 *		
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 February 2021	Examiner Sterle, Dieter
CATEGORY OF CITED DOCUMENTS 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 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			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 19 5974

5 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
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25-02-2021

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