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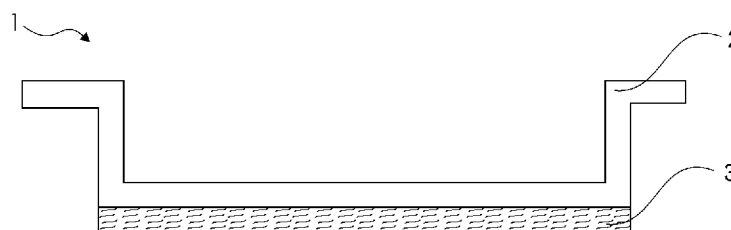
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(54) Title: A COOKING ACCESSORY

Figure 2



(57) Abstract: The present invention relates to a cooking accessory made of aluminum and stainless steel material with high thermal reflectance, used in both domestic and industrial ovens.



Description**A COOKING ACCESSORY**

- [0001] The present invention relates to a cooking accessory made of aluminum and stainless steel material with high thermal reflectance, used in both domestic and industrial ovens.
- [0002] In both domestic and industrial ovens, as an alternative to enamel coated cooking accessories (trays, cookers, etc.), accessories made of aluminum and stainless steel are also preferred due to hygiene and rapid heating properties. The disadvantage of cooking accessories made of such materials with high thermal reflectance is in that they reflect the heat coming thereon to the inner environment of the oven, and create on the lower surface of the food product (the surface contacting the accessory and not directly facing the heater) a less heated surface, with likely adverse effects on cooking. Therefore, particularly in cooking modes in which the upper and the lower heaters operate simultaneously, the problem of inadequate cooking/baking of the lower surface of the food product, occurs. This problem is frequently experienced particularly with pastries in which cooking/baking of the lower surface is important, and lessens the quality of the cooked food.
- [0003] In the state of the art, to solve this problem, the user changes the cooking position of the tray during cooking, however this constitutes a difficulty of use and leads to further energy loss due to the oven door being opened.
- [0004] The most suitable solution method to solve this technical problem is enabling the bases of such cooking accessories to have a structure maintaining heat thereon and dissipating heat homogeneously.
- [0005] In the state of the art, for this solution, the base surface of a cooking accessory is made of a different material or coating applications such as enamel and the like are performed to reduce thermal reflectance. However, such solutions are not highly producible and lead to new problems such as generation of an additional thermal mass in the system.
- [0006] In the invention, subject matter of the state of the art patent application no. WO 2014 140 388 A1, a composite material coating is mentioned, which is a glass/graphene mixture applied on the upper surface of a countertop,

however, since this application is not related to the cooking accessories subject to high temperatures, it is not aimed at solving the problem in said technical field.

- [0007] Another state of the art patent application no. KR 2014 004 85 90 A discloses an application for coating a microwave oven door with graphene for inhibiting electromagnetic waves from leaking out. However, since this application is not associated to thermal reflectance, it does not contribute in solving the technical problem relating cooking accessories subject to high temperatures.
- [0008] Another state of the art patent no. KR 1014 240 89 B1 mentions a method for coating all surfaces of a cooking instrument with carbon nano-tubes. The aim here is to obtain a cooking instrument preventing the food product from sticking on the cooking instrument, and enabling homogeneous distribution of heat on the food product. In addition, the cooking instrument is enabled not to lose its structural characteristics even after long term use thanks to the durability advantage provided by its carbon structure. In addition, it is further disclosed that advantages are obtained when graphite is added to said coating, such as the food product not sticking on the cooking instrument and burning due to high heat being prevented. However, the graphite coating disclosed in the invention relates to applying said coating on the surface of the cooking instrument directly contacting the food product, or to the heat source of a cooking instrument having its own heat source (resistance). Therefore, said invention does not provide any advantage for solving the problem of homogeneously distributing the heat on all surface area of the food product in cooking accessories used in ovens.
- [0009] The aim of the present invention is to obtain a cooking accessory (tray, cooker, etc.) made of aluminum and stainless steel material with high thermal reflectance, comprising a base portion with a structure enabling the lower surface of a food product to be cooked adequately by holding heat thanks to the improvement made in cooking accessories used in both domestic and industrial ovens.
- [0010] The cooking accessory realized to achieve the aim of the present invention

and disclosed in the first claim and the dependent claims, comprises a coating with graphene content on the surface of its base portion not contacting the food product.

[0011] In an embodiment of the invention, said coating with graphene content is applied to the surface of the base portion of the cooking accessory not contacting the food product by spraying.

[0012] In another embodiment of the invention, said coating with graphene content is applied to the surface of the base portion of the cooking accessory not contacting the food product by dipping method.

[0013] In another embodiment of the invention, said coating with graphene content is applied to the surface not contacting the food product of the base portion of the cooking accessory made of glass.

[0014] The cooking accessory realized to achieve the aims of the present invention is illustrated in the accompanying drawings, wherein:

[0015] Figure 1 is a schematic view of the base coating of the invention.

[0016] Figure 2 is a sectional view of the cooking accessory of the invention.

[0017] The elements in the figures are numbered individually and the correspondence of these numbers are given hereinafter.

1. Cooking accessory
2. Base portion
3. Base coating with graphene content

[0018] The cooking accessory (1) is made of aluminum and stainless steel material with high thermal reflectance used in both domestic and industrial ovens, and comprises a base portion (2) consisting of at least one piece.

[0019] The cooking accessory (1) of the invention comprises a base coating (3) containing exfoliated graphene additive dissolved into a silicone resin (polydimethylsiloxane) by means of a silicone bonding agent, and applied on the surface of said base portion (2) not contacting food product by spraying or dipping method.

[0020] The graphene used in the cooking accessory (1) of the invention, has a thickness <4nm, diameter of 0.5 μ m, a carbon purity of > 99 and a total surface area > 250g/m².

[0021] In another embodiment of the invention, said base coating (3) with

graphene content is applied to cooking accessories (1) made of glass, and cooking accessories (1) made of glass with base coating (3) with graphene content are obtained.

[0022] By means of the invention, the base surface of the food product in the cooking accessory (1) is enabled to cooked adequately without any heat loss.

Claims

1. A cooking accessory (1) comprising a base portion (2) consisting of at least one piece, made of aluminum or stainless steel material with high thermal reflectance, **characterized by** having a base coating (3) containing exfoliated graphene additive dissolved into a silicone resin (polydimethylsiloxane) by means of a silicone bonding agent, applied on the surface of said base portion (2) not contacting food product by spraying or dipping method.
2. Cooking accessory (1) according to claim 1, **characterized by** the thickness of the graphene being <4nm.
3. Cooking accessory (1) according to claim 1, **characterized by** the diameter of the graphene being 0.5 μ m.
4. Cooking accessory (1) according to claim 1, **characterized by** the carbon purity of the graphene being > 99.
5. Cooking accessory (1) according to claim 1, **characterized by** the total surface area of the graphene being > 250g/m².
6. A cooking accessory (1) obtained by applying the base coating (3) with graphene content disclosed in the claims 1 to 5, to cooking accessories (1) made of glass.

Figure 1

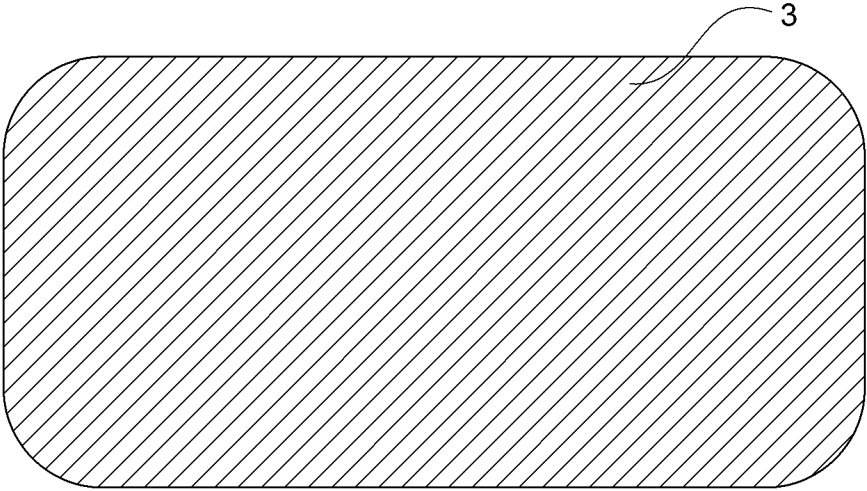
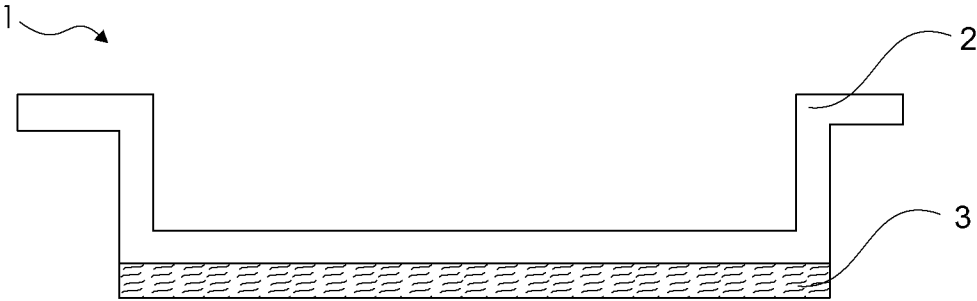


Figure 2



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/063831

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J36/04 C09D183/04 C08K9/06
ADD.

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)
A47J C09D C08K

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ES 1 138 281 U (DIAGO USO JOSÉ LUIS [ES]; CARRILLO GARCIA RUBÉN JESÚS [ES]; COQUILLAT) 9 April 2015 (2015-04-09) paragraphs [0038], [0039]; claim 1; figures	1-5
Y	----- KR 2014 0016045 A (TAE GUK IBA INC [KR]) 7 February 2014 (2014-02-07) paragraphs [0008], [0009]	1-5
A	----- CN 106 235 890 A (QIN YUANZI) 21 December 2016 (2016-12-21) abstract; figures	1
A	----- WO 2015/145355 A1 (SABIC GLOBAL TECHNOLOGIES BV [NL]) 1 October 2015 (2015-10-01) abstract; claim 1	1



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 application or patent 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 such 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

23 August 2018

Date of mailing of the international search report

06/11/2018

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2018/063831

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-5

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5

A cooking accessory comprising a base portion consisting of at least one piece made of aluminum or stainless steel material with high thermal reflectance.

2. claim: 6

A cooking accessory made of glass.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/063831

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
ES 1138281	U	09-04-2015	NONE	

KR 20140016045	A	07-02-2014	NONE	

CN 106235890	A	21-12-2016	NONE	

WO 2015145355	A1	01-10-2015	CN 106103555 A	09-11-2016
			EP 3122805 A1	01-02-2017
			JP 2017512680 A	25-05-2017
			KR 20160135814 A	28-11-2016
			US 2018220501 A1	02-08-2018
			WO 2015145355 A1	01-10-2015
