(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 290 560 A1

(12) EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
07.03.2018 Bulletin 2018/10

(21) Application number: **16785959.4**

(22) Date of filing: **29.04.2016**

(51) Int Cl.:
D06F 33/02 *(2006.01)*

(86) International application number:
PCT/CN2016/080655

(87) International publication number:
WO 2016/173531 (03.11.2016 Gazette 2016/44)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **30.04.2015 CN 201510217715**

(71) Applicant: **Qingdao Haier Washing Machine Co., Ltd.**
Shandong 266101 (CN)

(72) Inventors:
- **XU, Sheng**
  Qingdao, Shandong 266101 (CN)
- **LI, Yang**
  Qingdao, Shandong 266101 (CN)
- **JI, Chenyu**
  Qingdao, Shandong 266101 (CN)
- **WANG, Shuchun**
  Qingdao, Shandong 266101 (CN)
- **LI, Yan**
  Qingdao, Shandong 266101 (CN)
- **YIN, Junming**
  Qingdao, Shandong 266101 (CN)

(74) Representative: **HGF Limited**
4th Floor
Merchant Exchange
17-19 Whitworth Street West
Manchester M1 5WG (GB)

(54) WASHING MACHINE CONTROL METHOD AND WASHING MACHINE

(57) A washing machine and a control method thereof are provided. The present application belongs to the fields of washing machines and control methods thereof, and is designed to solve problems that an existing method is difficult to be applied to practice, and the like. The control method of the washing machine includes: taking a photograph or video of each piece of clothes to be washed before the clothes are thrown into a washing drum or during a process of rolling and weighing the clothes; comparing, by a control apparatus, clothes data in a database with at least one photograph or at least one picture extracted from the video to confirm basic information of each piece of clothes to be washed; and automatically selecting, by the control apparatus, a washing procedure according to the basic information of all the clothes to be washed. The washing machine and control method thereof solve the problem that the existing method is difficult to be applied to practice, and are convenient in use and high in accuracy for determining the clothes information.

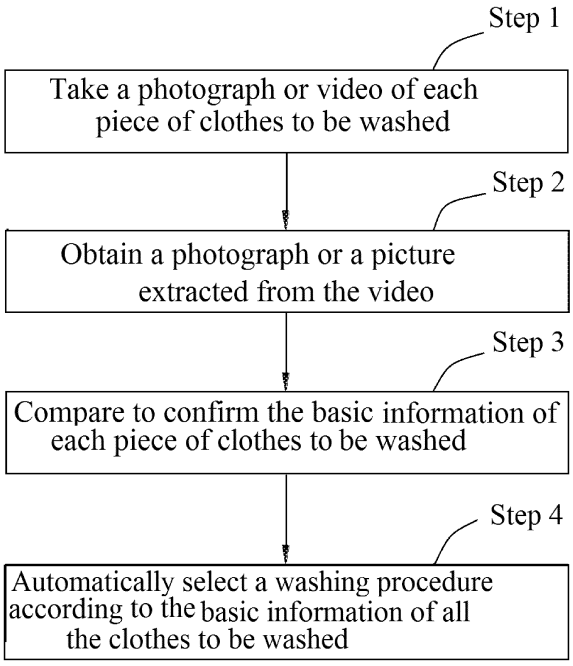


FIG.1

EP 3 290 560 A1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a washing machine and a control method thereof.

BACKGROUND

[0002] To achieve a better washing effect, a washing machine provides different washing procedures for selection according to information about clothes to be washed, such as material, colors and the like. However, if the washing procedures are selected manually, there exists various problems. For example, there exists a large error, and the washing procedures are time-consuming. To avoid the above problems, the users popularly expect that the washing machine can automatically identify information of the material of the clothes to select the washing procedures.

[0003] An existing method for automatically identifying information of the material of the clothes to select the washing procedures is achieved as follows: information of the clothes to be washed is acquired by an image processing apparatus and an information input apparatus, and transmitted to a computer program controller; it is logically determined by a control system whether the clothes to be washed are suitable for mixed washing; and a best washing procedure is automatically selected for the clothes suitable for mixed washing. The method does not clearly describe how to acquire the information of the clothes to be washed, causing that the method is difficult to be used practically.

SUMMARY

[0004] The present disclosure aims to propose a control method of a washing machine. The control method easy to use and has high accuracy in determining information of the clothes.

[0005] The present disclosure further aims to propose a washing machine capable of realizing automatic identification of the clothes to be washed and active recommendation of the washing procedures.

[0006] In view of the above, a control method of a washing machine is proposed in one aspect of the present disclosure.

[0007] A photograph or video of each piece of clothes to be washed is taken before each piece of clothes to be washed is thrown into a washing drum or during a process of rolling and weighing the clothes to be washed. A control apparatus comparises with clothes data in a database with at least one photograph or at least one picture extracted from the video, to confirm basic information of each piece of clothes to be washed. A washing procedure is automatically selected by the control apparatus according to the basic information of all the clothes to be washed.

[0008] Specially, the method includes the following steps:

step 1, taking a photograph or video of each piece of clothes to be washed;

step 2, obtaining, by the control apparatus, at least one photograph or at least one picture extracted from the video image;

step 3, comparing, by the control apparatus, the photograph or picture with the clothes data in the database to confirm the basic information of each piece of clothes to be washed; and

step 4, automatically selecting, by the control apparatus, a washing procedure according to the basic information of all the clothes to be washed.

[0009] Specially, washing times of each piece of clothes or specified clothes are recorded by the control apparatus.

[0010] Specially, the photograph or video of each piece of clothes to be washed is taken by adopting a three-dimensional imaging technology.

[0011] Specially, a plurality of pictures are extracted from the video, and the basic information of the clothes is confirmed in combination with the plurality of pictures.

[0012] Specially, the basic information of the clothes comprises colors, patterns, texture, material, decoloration property, types, weight, styles, best washing temperature, washing requirements and/or brands.

[0013] Specially, the database is provided in a local server, a remote server or cloud server.

[0014] Specially, the clothes to be washed are unfolded and photographed in front of a camera before thrown into the washing drum.

[0015] Specially, the washing procedure comprises the followings: whether the cloths are mixed washing or not; washing time; water temperature during washing; detergent types; washing times and/or rinsing times.

[0016] On the other hand, the present disclosure proposes a washing machine applying the above control method.

[0017] The washing machine includes a photographing apparatus and/or a videoing apparatus. The photographing apparatus and/or the videoing apparatus is installed in an inner drum, or on an observation window or on an upper cover of the washing machine.

[0018] According to the control method of the washing machine provided by the present disclosure, an image of the clothes to be washed is captured by photographing or videoing; the basic information of each piece of clothes to be washed is confirmed after comparison, and a washing procedure is automatically selected according to the basic information of all the clothes to be washed. Therefore, the problem that the existing method is difficult to be applied to practice is solved, realizing convenient use

and high accuracy for determining the clothes information.

[0019] The washing machine of the present disclosure includes a photographing apparatus and/or a videoing apparatus. The photographing apparatus and/or videoing apparatus is used for taking a photograph or video of the clothes to be washed, so as to obtain the basic information. Therefore, the automatic identification of the clothes to be washed and active recommendation of the washing procedures can be achieved, and the automation degree is high.

BRIEF DESCRIPTION OF DRAWINGS

[0020] FIG. 1 is a flow chart illustrating a control method of a washing machine provided by a preferred embodiment I of the present disclosure.

DETAILED DESCRIPTION

[0021] The technical solution of the present disclosure will be further described below in combination with the drawings and specific embodiments.

Preferred Embodiment I

[0022] The present preferred embodiment discloses a control method of a washing machine. As shown in FIG. 1, the control method includes steps described below.

[0023] In step 1, a photograph or video of each piece of clothes to be washed is taken. Depending on specific use conditions, the photograph or video of each piece of clothes to be washed may be taken before the clothes are thrown into a washing drum, or during a process of rolling and weighing the clothes.

[0024] Considering that the photograph or picture captured after the clothes to be washed are kneaded is difficult to reflect an entire shape and appearance of the clothes, the clothes to be washed are preferably unfolded and photographed in front of a camera before thrown into the washing drum. Accordingly, the photograph or picture captured at this time is most clear and accurate.

[0025] The photograph or video of each piece of clothes to be washed taken by adopting a three-dimensional imaging technology, so as to ensure that the captured picture or image is informative. Thus, it is tried to use as few pictures or images as possible to represent each piece of clothes to be washed.

[0026] In the case that the video of the clothes to be washed is taken, the clothes are generally in a motion state. In this case, a plurality of pictures need to be extracted from the video, and the basic information of the clothes is confirmed in combination with the plurality of pictures.

[0027] In step 2, at least one photograph or at least one picture extracted from the video is obtained by a control apparatus. The photograph or picture should be clear enough. Otherwise, the photograph or picture cannot be used for comparison. When the photographs or pictures are repeated, the clearest one is reserved and the others are deleted.

[0028] In Step 3, the photograph or picture is compared with clothes data in the database by the control apparatus to confirm the basic information of each piece of clothes to be washed. The basic information of the clothes mainly includes but not limited to colors, patterns, texture, material (including cotton, linen, chemical fiber, dacron, silk, silk fabric, down feather, denim and the like), decoloration property, types (including underwear, overcoat, trousers, children clothes, sheet, quilt covers and the like), weight, styles, best washing temperature, washing requirements and/or brands, which are uses as a basis for determining the washing procedure subsequently.

[0029] The database may be arranged in a local server. Optionally, the database may also be provided in a remote server or cloud server, and may be communicated through Internet of things to form data reports and the like.

[0030] After the basic information of the clothes to be washed is confirmed, washing times of each piece of clothes or specified clothes is recorded by the control apparatus. The control apparatus is configured to remind the user that "xx clothes have been worn x times, and need to be maintained and treated" when the washing times of some clothes reach a set value. The control apparatus is further configured to master user preferences (preferences in aspects of colors, material, brands and the like) according to the washing times of the clothes, so as to recommend new fashionable products for the user pertinently.

[0031] In Step 4, the washing procedure is automatically selected by the control apparatus according to the basic information of all the clothes to be washed. The washing procedure includes but not limited to mixed washing or not, washing time, water temperature during washing, detergent types, washing times and/or rinsing times.

[0032] A washing machine applying the above control method includes a photographing apparatus and/or a videoing apparatus. The photographing apparatus and/or the videoing apparatus is installed on an upper cover of the washing machine. At the time of preparing washing, the clothes to be washed are thrown into an inner drum through an opening. The turned-up upper cover is exactly aligned with the opening of the inner drum. Since the photographing apparatus and/or the videoing apparatus is arranged on the upper cover, it is more convenient to take a photograph or video of the clothes to be washed.

Preferred Embodiment II

[0033] The present preferred embodiment provides a washing machine and a control method thereof. The present preferred embodiment is basically identical with the preferred embodiment I in contents. The control method includes: taking a photograph or video of each piece of clothes to be washed before the clothes are

thrown into the washing drum or during the process of rolling and weighing the clothes; comparing, by a control apparatus, at least one photograph or at least one picture extracted from the video with the clothes data in the database, so as to confirm basic information of each piece of clothes to be washed; and automatically selecting, by the control apparatus, a washing procedure according to the basic information of all the clothes to be washed.

[0034] The differences between the present embodiment and the preferred Embodiment I lie in that: specific steps of the control method are not limited, as long as the basic information of the clothes can be determined according to the photograph or the picture extracted from the video of the clothes to be washed; specific methods and devices used for taking a photograp or video are not limited as long as a clear image of the clothes can be obtained; the basic information of the clothes not only includes colors, patterns, texture, material and/or brands, but also includes other information which can be used as a basis for determining the washing procedures.

[0035] The washing machine applying the above control method can simultaneously include a photographing apparatus and a videoing apparatus. Specific installation positions of the photographing apparatus and the videoing apparatus are not limited. The photographing apparatus and the videoing apparatus can be installed on the upper cover of the washing machine, and can also be installed in the inner drum or on the observation window of the washing machine. The photographing apparatus and the videoing apparatus can also be arranged separately, as long as the clothes to be washed can be photographed or videoed conveniently and accurately.

[0036] It shall be noted that the above contents are only preferred embodiments of the present disclosure and used technical principles. It can be understood for those skilled in the art that the present disclosure is not limited to specific embodiments described herein. For those skilled in the art, the present disclosure can be subject to various apparent variations, readjustments and replacements without departing from a protection scope of the present disclosure. Therefore, although the present disclosure is described in detail through above embodiments, the present disclosure is not only limited to above embodiments. The present disclosure can also include more other equivalent embodiments without deviating from conceptions of the present disclosure. The scope of the present disclosure is determined by a scope of attached claims.

Claims

1. A control method of a washing machine, wherein a photograph or video of each piece of clothes to be washed is taken before the clothes to be washed are thrown into a washing drum or during a process of rolling and weighing the clothes to be washed; a control apparatus compares clothes data in a database with at least one photograph or at least one picture extracted from the video, to confirm basic information of each piece of clothes to be washed; and the control apparatus automatically selects a washing procedure according to the basic information of all the clothes to be washed.

2. The control method of the washing machine according to claim 1, wherein the method comprises the following steps:

   step 1, taking a photograph or video of each piece of clothes to be washed;
   step 2, obtaining at least one photograph or at least one picture extracted from the video by the control apparatus;
   step 3, comparing, by the control apparatus, the clothes data in the database with the photograph or the picture to confirm the basic information of each piece of clothes to be washed; and
   step 4, automatically selecting, by the control apparatus, the washing procedure according to the basic information of all the clothes to be washed.

3. The control method of the washing machine according to claim 1, wherein washing times of each piece of clothes or specified clothes are recorded by the control apparatus.

4. The control method of the washing machine according to claim 1, wherein the photograph or video of each piece of clothes to be washed is taken by adopting a three-dimensional imaging technology.

5. The control method of the washing machine according to claim 1, wherein a plurality of pictures are extracted from the video, and the basic information of the clothes is confirmed in combination with the plurality of pictures.

6. The control method of the washing machine according to any one of claims 1-5, wherein the basic information of the clothes is selected from a group of the followings: colors, patterns, texture, material, decoloration property, types, weight, styles, best washing temperature, washing requirements and brands.

7. The control method of the washing machine according to any one of claims 1-5, wherein the database is provided in at least one of a local server, a remote server and cloud server.

8. The control method of the washing machine according to any one of claims 1-5, wherein the clothes to be washed are unfolded and photographed in front of a camera before thrown into the washing drum.

9. The control method of the washing machine according to any one of claims 1-5, wherein the washing procedure comprises at least one of followings: whether the cloths are mixed washing or not; washing time; water temperature during washing; detergent types; washing times and rinsing times.

10. A washing machine applying the control method according to any one of claims 1-9, wherein the washing machine comprises at least one of a photographing apparatus and a videoing apparatus, wherein at least one of the photographing apparatus and the videoing apparatus is installed in an inner drum, an observation window or on an upper cover of the washing machine.

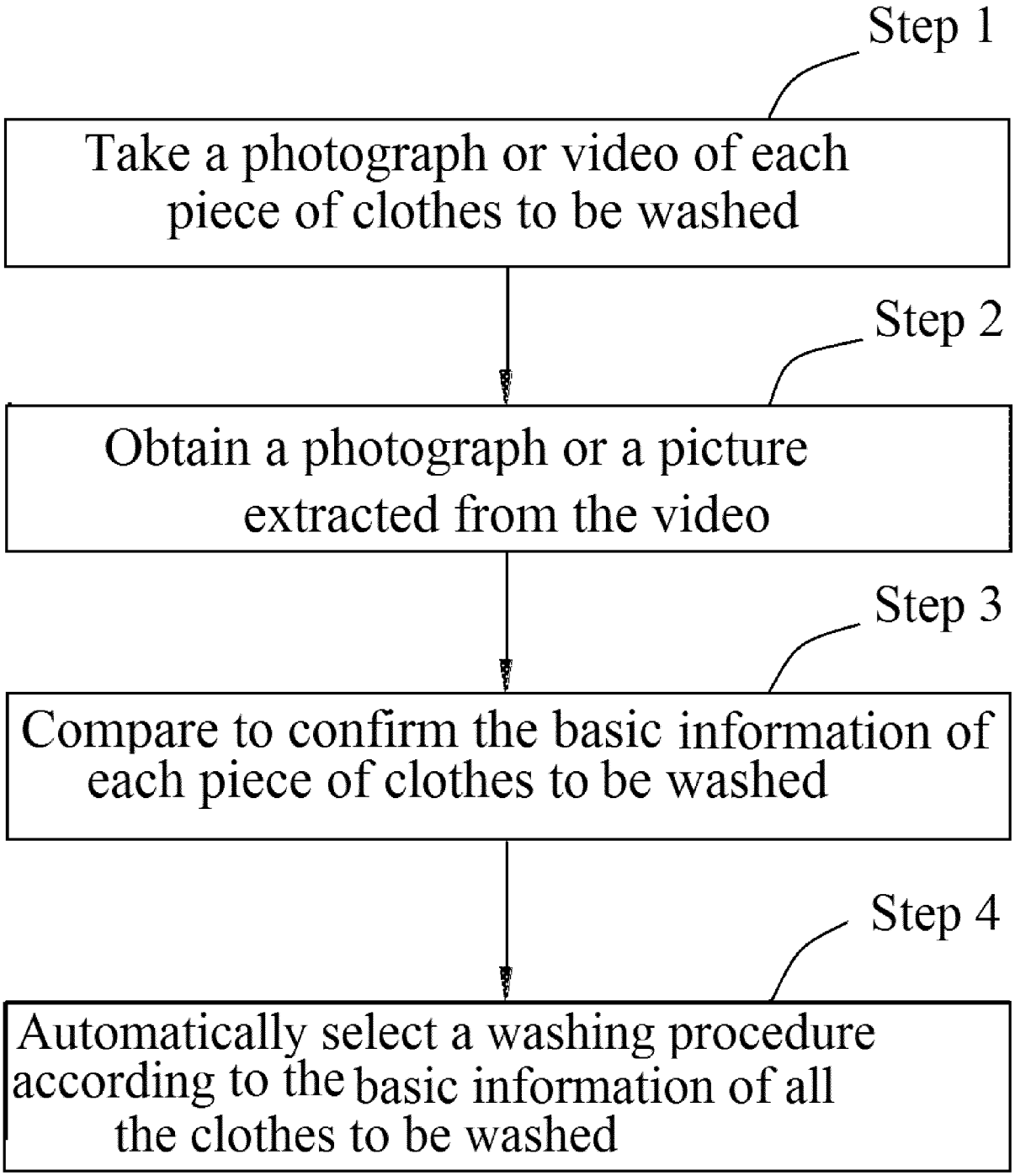

Step 1
Take a photograph or video of each piece of clothes to be washed
Step 2
Obtain a photograph or a picture extracted from the video
Step 3
Compare to confirm the basic information of each piece of clothes to be washed
Step 4
Automatically select a washing procedure according to the basic information of all the clothes to be washed

FIG.1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/080655

A. CLASSIFICATION OF SUBJECT MATTER

D06F 33/02 (2006.01) i

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)

D06F

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)

CNABS, CNTXT, EPODOC, WPI: washer, washing, cloth???, photo, picture, camera, video, material, kind, color, colour, information

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 20130044764 A (LG ELECTRONICS INC.), 03 May 2013 (03.05.2013), description, paragraphs 21-24, and figures 3-4	1-2, 4-10
Y	KR 20130044764 A (LG ELECTRONICS INC.), 03 May 2013 (03.05.2013), description, paragraphs 21-24, and figures 3-4	3
Y	CN 103726262 A (SINCERE-HOME HOME APPLIANCE MANUFACTURING CO., LTD.), 16 April 2014 (16.04.2014), abstract	3
X	CN 102443998 A (SAMSUNG ELECTRONICS CO., LTD.), 09 May 2012 (09.05.2012), description, paragraphs 70-71, and figures 2-3	1-2, 4-10
X	KR 20140073197 A (SAMSUNG ELECTRO-MECHANICS CO.), 16 June 2014 (16.06.2014), abstract, and figures 1-2	1-2, 4-10
X	CN 102517842 A (HAIER ELECTRONICS GROUP CO., LTD. et al.), 27 June 2012 (27.06.2012), abstract, and figure 2	1-2, 4-10

☒ 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	Date of mailing of the international search report
27 July 2016 (27.07.2016)	**04 August 2016 (04.08.2016)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **GUO, Xu** Telephone No.: (86-10) **62084600**

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/080655

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 103993455 (LI, Feng), 20 August 2014 (20.08.2014), the whole document	1-10

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2016/080655

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
KR 20130044764 A	03 May 2013	None	
CN 103726262 A	16 April 2014	CN 103726262 B	20 April 2016
CN 102443998 A	09 May 2012	ES 2557602 T3	27 January 2016
		US 2012090099 A1	19 April 2012
		CN 102443998 B	23 March 2016
		EP 2441871 B1	07 October 2015
		RU 2490382 C2	20 August 2013
		KR 20120038271 A	23 April 2012
		RU 2011135435 A	10 March 2013
		EP 2441871 A2	18 April 2012
KR 20140073197 A	03 May 2013	None	
CN 102517842 A	27 June 2012	CN 102517842 B	02 March 2016
CN 103993455 A	20 August 2014	None	

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