



(11) **EP 3 144 855 A1**

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

(43) Date of publication:
22.03.2017 Bulletin 2017/12

(51) Int Cl.:
G06K 13/00 (2006.01) **G07F 19/00** (2006.01)
B65H 7/06 (2006.01)

(21) Application number: **15793033.0**

(86) International application number:
PCT/CN2015/070165

(22) Date of filing: **06.01.2015**

(87) International publication number:
WO 2015/172575 (19.11.2015 Gazette 2015/46)

(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

- **GUO, Jing**
Guangzhou
Guangdong 510663 (CN)
- **CAO, Guozhong**
Guangzhou
Guangdong 510663 (CN)
- **LIANG, Tiancai**
Guangzhou
Guangdong 510663 (CN)
- **WU, Hongjun**
Guangzhou
Guangdong 510663 (CN)

(30) Priority: **14.05.2014 CN 201410203320**

(71) Applicant: **GRG Banking Equipment Co., Ltd.**
Guangzhou, Guangdong 510663 (CN)

(72) Inventors:

- **LUO, Panfeng**
Guangzhou
Guangdong 510663 (CN)

(74) Representative: **Maiwald Patentanwalts GmbH**
Engineering
Elisenhof
Elisenstrasse 3
80335 München (DE)

(54) **SHEET-TYPE MEDIUM DEVIATION CORRECTION DEVICE AND AUTOMATIC TELLER MACHINE**

(57) A sheet-type medium deviation correction device and an automatic teller machine. The sheet-type medium deviation correction device comprises an upper supporting plate (11), a lower supporting plate (12), a front guide wheel set, a front end position detecting element, a lateral border position detecting unit, a deviation correction assembly, and a delivery assembly. The deviation correction assembly comprises a belt (52) and a pair of belt pulleys (42). The delivery direction of the belt (52) is perpendicular to the lateral border of the upper supporting plate (11) or the lower supporting plate (12). The delivery assembly comprises a pair of delivery wheels (71, 72). The delivery direction of the delivery wheels (71, 72) is perpendicular to that of the belt (52).

The belt (52) is used for delivering a sheet-type medium to the border of the belt (52) to be aligned with the lateral border of the supporting plate, thereby achieving the deviation correction purpose. When the lateral border position detecting unit detects that the sheet-type medium is corrected, the delivery assembly is actuated to continuously deliver the sheet-type medium forward. The lateral border position detecting unit is arranged to detect whether the sheet-type medium is corrected, so the problem of insufficient deviation correction or excessive deviation correction is avoided.

EP 3 144 855 A1

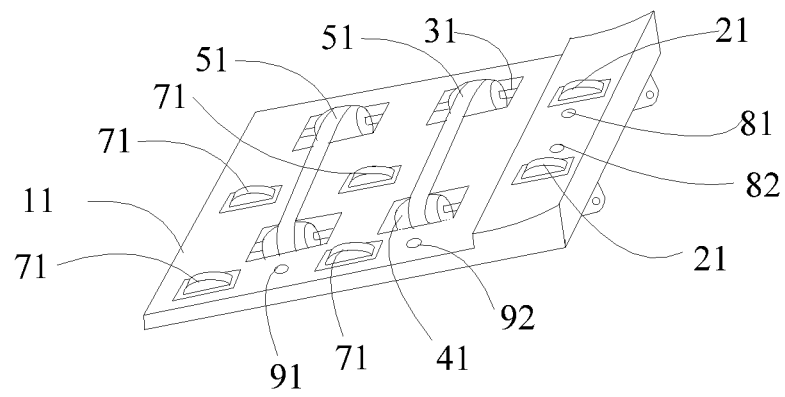


Fig. 1

Description

CROSS REFERENCE OF RELATED APPLICATION

[0001] This application claims the benefit of priority to Chinese Patent Application No. 201410203320.7 titled "SHEET-TYPE MEDIUM SKEW-CORRECTION DEVICE AND AUTOMATIC TELLER MACHINE", filed with the Chinese State Intellectual Property Office on May 14, 2014, the entire disclosure of which is incorporated herein by reference.

FIELD

[0002] This application relates to skew-correction devices, and more particularly to a transmission device configured to align sheet-type mediums having various sizes, such as banknotes, checks or other similar objects, along a certain side wall.

BACKGROUND

[0003] In a deposit process of an ATM (abbreviation for the Automatic Teller Machine), banknotes are often placed askew at a deposit opening of the ATM by a user, thus, the banknotes are required to be corrected by a skew-correction device before entering into the ATM.

[0004] Thus, the skew-correction device is mainly used in an apparatus which has a special requirement on the position of mediums in a conveying passage. For example, in a depositing/withdrawing apparatus, it is required to scan a magnetic stripe of a check, and in the case that banknotes and checks with various sizes are mixed together and deposited, sheet-type mediums at any positions in the passage are aligned along a certain side wall, which facilitates the recognition of the mediums subsequently.

[0005] A conventional skew-correction device generally includes a set of skew wheels and an adjusting wheel. An axis direction of the set of skew wheels is at a certain angle (greater than 0 degree and smaller than 90 degrees) with respect to a side wall, which allows moving tracks of the mediums to be gradually close to a certain side wall. An axis direction of the adjusting wheel is perpendicular to the side wall, and is mounted close to the certain side wall along which the mediums are to be aligned, which plays an adjusting and correcting function in the skew-correcting of the mediums. This skew-correction device may achieve a good skew-correcting effect to hard and new mediums, but when correcting soft mediums having been circulated in the market for a long time, the following two issues often present. One issue is that banknote is jammed, in which the medium having skewed towards the direction of the skew wheels is not corrected after being conveyed by the skew wheel assembly, and further bump the side wall of the passage when being moved out of the skew-correction mechanism, thus causing the banknote jamming. The other is-

sue is that the medium is moved out of a skew-correction track before the skew-correction is complete, and some mediums are moved out of the skew-correction assembly even before the positions to be corrected.

[0006] Thus, it is necessary to provide a new skew-correction device for correcting sheet-type mediums, which allows the sheet-type mediums to be aligned along a side of a side wall of a passage, and more importantly, and the skew-correction device is adapted to the correct various material mediums, various sizes, and various skewing states, so as to overcome the defects of the conventional technology.

SUMMARY

[0007] To address an issue that a skew-correction device for sheet-type mediums in the conventional technology insufficiently or excessively corrects sheet-type mediums of different materials and with different sizes, a skew-correction device for sheet-type mediums is provided according to the present application, which is adapted to correct mediums of various materials, various sizes, and various skewing states.

[0008] The skew-correction device for sheet-type mediums according to the present application includes: an upper holding plate and a lower holding plate for holding the following parts and forming a conveying passage for sheet-type mediums, a front guide wheel set at least including one front guide wheel, in which the one front guide wheel is mounted at a front end of the upper holding plate or a front end of the lower holding plate for guiding the mediums into the conveying passage, a front end position detecting element located at the front end of each of the upper holding plate and the lower holding plate for detecting whether a medium has entered into the conveying passage, a side edge position detecting unit including at least two position detectors, in which the at least two position detectors are distributed at a certain interval on side edges of the upper holding plate and the lower holding plate, and the at least two position detectors are arranged in a direction parallel to the side edges, the at least two position detectors are configured to detect whether an edge of the medium is aligned along the side edge of the upper holding plate or the side edge of the lower holding plate, at least one skew-correction assembly including a belt and a pair of pulleys, in which a conveying direction of the belt is perpendicular to the side edge of the upper holding plate or the side edge of the lower holding plate, and at least one conveying assembly including a pair of conveying wheels, in which a conveying direction of the conveying wheels is perpendicular to the conveying direction of the belt.

[0009] Preferably, the skew-correction assembly is located between the conveying assembly and the front guide wheel set.

[0010] Optionally, two sets of skew-correction assemblies are provided, and two sets of conveying assemblies are provided, specifically, one set of skew-correction as-

sembly is located between one set of conveying assembly and the front guide wheel set, and the other skew-correction assembly is located between the two sets of conveying assemblies. That is to say, the skew-correction assemblies and the conveying assemblies are arranged alternately, and the skew-correction assemblies are closer to the front guide wheel set, which achieves the purpose of skew-correcting first and then conveying.

[0011] Preferably, each pulley of the skew-correction assembly is a drum-shaped wheel, and the drum-shaped wheel is fixed to the upper holding plate and/or the lower holding plate by a shaft.

[0012] An automatic teller machine having the skew-correction device for sheet-type mediums is further provided according to the present application.

[0013] In the skew-correction device for sheet-type mediums according to the present application, the sheet-type medium is guided into the medium conveying passage by the front guide wheel set, and when the front end position detecting element has detected that a medium has entered into the conveying passage, and the skew-correction assembly starts to operate, and the belt conveys the medium to a position close to a side edge of each of the upper holding plate and the lower holding plate. The side edge position detecting unit arranged at the side edge includes at least two position detectors, and the two position detectors are spaced apart a certain distance, thus in the case that each of the two position detectors has detected the medium, it is proved that the medium is not skew anymore, and then the conveying assembly is started to convey the sheet-type medium passing through the skew-correction device, which achieves the purpose of skew-correction. In the present application, the skew-correction assembly and the conveying assembly with conveying directions perpendicular to each other are employed to transmit the medium, and the side edge position detecting unit is employed to detect the edge of the medium, and when the two position detectors both have detected the medium, that is, the skew-correction is completed, the conveying assembly is started then to convey the medium passing through the skew-correction device, avoiding an issue that a medium is moved out of the skew-correction track before the skew-correction of which finishes. In addition, the conveying assembly is started immediately after both of the two position detectors have detected the medium, thus, no issue of excessively skew-correction occurs, and the banknote jamming is avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Figure 1 is a schematic view showing the structures of various parts mounted on an upper holding plate of a skew-correction device for sheet-type mediums according to a preferred embodiment of the present application; and

Figure 2 is a schematic view showing the structures of various parts mounted on a lower holding plate of the corresponding skew-correction device for sheet-type mediums in Figure 1.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0015] The technical solutions according to the present application are described in detail hereinafter in conjunction with the drawings in the embodiments of the present application. Apparently, the embodiments described are only a part of the embodiments of the present application, rather than all embodiments. Based on the embodiments in the present application, all of other embodiments, made by the person skilled in the art without any creative efforts, fall into the scope of the present application.

[0016] Reference is made to Figures 1 and 2. A skew-correction device for sheet-type mediums according to this embodiment includes an upper holding plate 11 and a lower holding plate 12. The upper holding plate 11 and the lower holding plate 12 are configured to support the following parts and form a conveying passage for sheet-type mediums. As shown in Figure 1, a pair of front guide wheels 21 is mounted at a front end of the upper holding plate 11, and correspondingly, a pair of conveying wheels 22 in cooperation with the front guide wheels 21 is mounted at a front end of the lower holding plate 12. The pair of front guide wheels 21 is cooperated with the pair of conveying wheels 22 to form a front guide wheel set. The front guide wheel set is configured to guide the mediums into the conveying passage constructed by the upper holding plate 11 and the lower holding plate 12. The positions of the conveying wheels 22 and the front guide wheels 21 can be exchanged with each other up and down. That is to say, the front guide wheels 21 may also be mounted at the front end of the lower holding plate 12.

[0017] A front end position detecting element is further provided at a front end of each of the upper holding plate 11 and the lower holding plate 12. The front end position detecting element includes two position detectors 81 and 82 located to be spaced apart by a certain distance for detecting whether a medium has been entered into the conveying passage. The skew-correction device for sheet-type mediums according to this embodiment especially further includes a side edge position detecting unit, which includes at least two position detectors 91 and 92. The at least two position detectors 91 and 92 are distributed at a certain interval on same side edges of the upper holding plate 11 and the lower holding plate 12, and the at least two position detectors 91 and 92 are located in a direction parallel to the side edge of the upper holding plate 11 or the lower holding plate 12. The at least two position detectors 91 and 92 are configured to detect whether an edge of the medium is aligned along the side edge of the upper holding plate 11 or the lower holding plate 12. That is to say, in the case that the medium is detected by each of the two position detectors 91 and 92, the edge of the medium has aligned along

the side edge of the upper holding plate 11 or the lower holding plate 12, and the medium is considered to have been corrected.

[0018] Further and necessarily, the skew-correction device for sheet-type mediums according to this embodiment at least includes a skew-correction assembly, and the skew-correction assembly includes a belt 51 and a pair of pulleys 41 mounted in the upper holding plate 11 and a belt 52 and a pair of pulleys 42 mounted in the lower holding plate 12. The belt 51 is rotated about the pair of pulleys 41, and the belt 52 is rotated about the pair of pulleys 42. The conveying direction of the belt 51 and the belt 52 are perpendicular to the side edge of the upper holding plate 11 or the lower holding plate 12. Thus, the belt 51 and the belt 52 cooperate to clamp and convey the sheet-type mediums to move the sheet-type mediums towards the side edges of the upper holding plate 11 and the lower holding plate 12 where the side edge position detecting unit is mounted, which allows the edges of the sheet-type mediums to be aligned along the side edges, and achieves the purpose of skew-correction. As shown in Figures 1 and 2, the pulleys 41 and 42 of the skew-correction assembly according to this embodiment are drum-shaped wheels, and the drum-shaped wheels 41 and 42 are mounted to the upper holding plate 11 and/or the lower holding plate 12 via shafts 31 and 32.

[0019] Necessarily, the skew-correction device for sheet-type mediums according to this embodiment includes at least one conveying assembly. As shown in Figures 1 and 2, the conveying assembly includes two pairs of conveying wheels 71 and 72 distributed in parallel. The conveying wheels 71 are mounted to the upper holding plate 11, and the conveying wheels 72 are mounted to the lower holding plate 12. The conveying wheels 71 is cooperated with the conveying wheels 72, and the conveying direction of the conveying wheels 71 and 72 are perpendicular to the conveying direction of the belts 51 and 52. The function of a conveying wheel set is to continue to convey forward the sheet-type mediums which have been corrected. Thus, the skew-correction assembly is located between the conveying assembly and the front guide wheel set. That is to say, the sheet-type mediums being guided into the conveying passage by the front guide wheel set are first conveyed to the side edge of the upper holding plate 11 and/or the lower holding plate 12 by a skew-correction wheel set, which allow the edges of the sheet-type mediums to be aligned along the side edge of the upper holding plate 11 and/or the lower holding plate 12 and are not skew anymore and then are continually conveyed by a conveying wheel set into the conveying passage.

[0020] In this embodiment, two sets of skew-correction assemblies are provided, that is, two sets of belt pulley assemblies (each set of belt pulley assembly includes a belt 51 and two drum-shaped wheels 41) in the upper holding plate 11, and two sets of belt pulley assemblies (each set of belt pulley assembly includes a belt 52 and

two drum-shaped wheels 42) in the lower holding plate 12 in cooperation with the two sets of belt pulley assemblies in the upper holding plate 11. Also two sets of conveying assemblies are provided, that is, four conveying wheels 71 in the upper holding plate 11 and four conveying wheels 72 in the lower holding plate 12 cooperated with the four conveying wheels 71 in the upper holding plate 11. Specifically, two pairs of conveying wheels distributed in parallel are one set. The set of skew-correction assembly closer to the front guide wheels 21 is located between a set of conveying assembly and the front guide wheel set, and the other set of skew-correction assembly is located between the two sets of conveying assemblies. That is to say, the skew-correction assemblies and the conveying assemblies are arranged alternately, and the skew-correction assemblies are closer to the front guide wheel set, which achieves the purpose of skew-correcting first and then conveying.

[0021] In the skew-correction device for sheet-type mediums according to this embodiment, the sheet-type medium is guided into the medium conveying passage by the front guide wheel set, and when the front end position detecting element has detected that a medium has entered into the conveying passage, the information is fed back to the controller, and an instruction is sent by the controller and thus the skew-correction assembly starts to operate, and the belt conveys the medium to a position close to the side edges of the upper holding plate and the lower holding plate. The side edge position detecting unit located at the side edges includes at least two position detectors, which are spaced apart a certain distance and arranged in a direction parallel to the side edges, thus in the case that both of the two position detectors have detected the medium (are covered by the medium), it is indicated that the medium is not skew anymore, and a signal is fed back by the position detectors to the controller, and at this time, the controller starts up the conveying assembly, and the conveying assembly continues to convey the sheet-type medium forward to the skew-correction device, so as to achieve the purpose of skew correction. In the present application, the skew-correction assembly and the conveying assembly with conveying directions perpendicular to each other are employed to deliver the medium, and the side edge position detecting unit is employed to detect the edge of the medium. After the two position detectors have both detected the medium, that is, after the skew-correction is completed, the conveying assembly is started up to convey the medium passing through the skew-correction device, which avoids the issue that a medium is moved out of the skew-correction track before the skew-correction is completed. In addition, the conveying assembly is started up immediately after both of the two position detectors have detected the medium, thus, excessively skew-correction and the banknote jamming are avoided.

[0022] An automatic teller machine is further provided according to an embodiment of the present application, and the automatic teller machine has the skew-correction

device for sheet-type mediums according to the above embodiments.

[0023] The above are only preferable embodiments of the present application and are not intended to limit the protection scope of the present application. Any equivalent variations made based on the specification and drawings of the present application should be deemed to fall into the protection scope of the present application.

Claims

1. A skew-correction device for sheet-type mediums, comprising:

an upper holding plate and a lower holding plate for holding following parts and forming a conveying passage for the sheet-type mediums, a front guide wheel set, at least comprising one front guide wheel, wherein the one front guide wheel is mounted at a front end of the upper holding plate or a front end of the lower holding plate for guiding the mediums into the conveying passage,

a front end position detecting element disposed at the front end of each of the upper holding plate and the lower holding plate for detecting whether a medium has entered into the conveying passage or not,

a side edge position detecting unit, comprising at least two position detectors, wherein the at least two position detectors are distributed at a certain interval side edges of the upper holding plate and the lower holding plate, and the at least two position detectors are arranged in a direction parallel to the side edges, the at least two position detectors are configured to detect whether an edge of the medium is aligned along the side edge of the upper holding plate or the side edge of the lower holding plate,

at least one skew-correction assembly, comprising a belt and a pair of pulleys, wherein a conveying direction of the belt is perpendicular to the side edge of the upper holding plate or the side edge of the lower holding plate, and at least one conveying assembly, comprising a pair of conveying wheels, wherein a conveying direction of the conveying wheels is perpendicular to the conveying direction of the belt.

2. The skew-correction device for sheet-type mediums according to claim 1, wherein the skew-correction assembly is located between the conveying assembly and the front guide wheel set.

3. The skew-correction device for sheet-type mediums according to claim 2, wherein two sets of skew-correction assemblies are provided, and two sets of con-

veying assemblies are provided, wherein one set of skew-correction assembly is located between one set of conveying assembly and the front guide wheel set, and the other skew-correction assembly is located between the two sets of conveying assemblies.

4. The skew-correction device for sheet-type mediums according to claim 3, wherein each pulley of the skew-correction assembly is a drum-shaped wheel, and the drum-shaped wheel is fixed to the upper holding plate and/or the lower holding plate by a shaft.

5. An automatic teller machine, comprising a skew-correction device for sheet-type mediums, wherein the skew-correction device for sheet-type mediums is the skew-correction device for sheet-type mediums according to any one of claims 1 to 4.

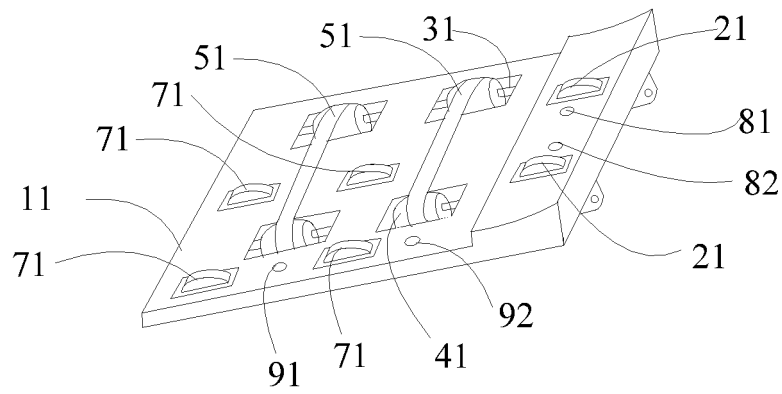


Fig. 1

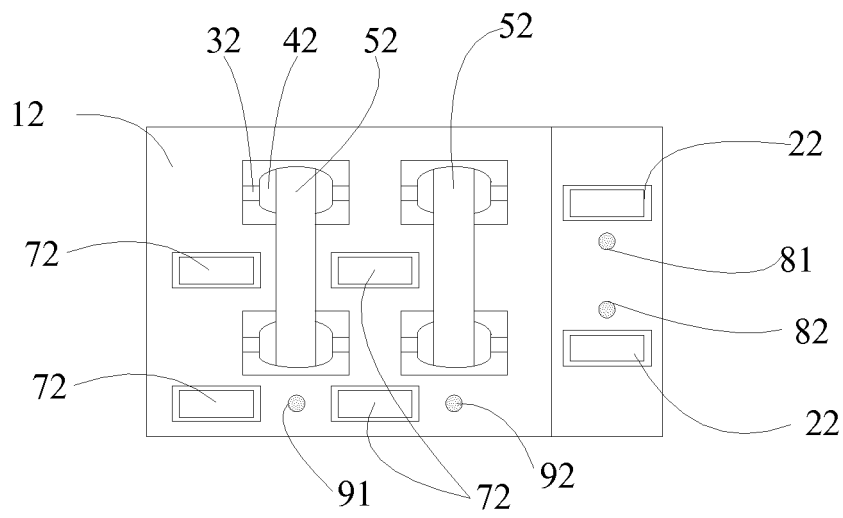


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2015/070165

A. CLASSIFICATION OF SUBJECT MATTER

G06K 13/00 (2006.01) i; G07F 19/00 (2006.01) i; B65H 7/06 (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)

G06K; G07F; B65H; G07D

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)

CNXTX, CNABS, VEN, CNKI, SIPOABS: SENSOR?, POSITION+, PARALLEL, +RIGHT+, VERTICAL, PERPENDICULAR+,
DIRECT,CROSS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 103956004 A (GRG BANKING EQUIPMENT CO., LTD.) 30 July 2014 (30.07.2014) the whole document	1-5
A	CN 102556714 A (BEIJING CANDW ELECTRONICS (GROUP) CO., LTD.) 11 July 2012 (11.07.2012) description, paragraphs [0022] to [0026], and figures 1 and 2	1-5
A	CN 102324154 A (GRG BANKING EQUIPMENT CO., LTD.) 18 January 2012 (18.01.2012) the whole document	1-5
A	CN 103771167 A (SHANDONG NEW BEIYANG INF TECH) 07 May 2014 (07.05.2014) the whole document	1-5
A	JP 57132284 A (KOPITETSUKUSUUABUREHINUNGUSUSH) 16 August 1982 (16.08.1982) the whole document	1-5

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

* Special categories of cited documents:	"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
"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	"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
"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)	"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
"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	"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report 17 March 2015
Name and mailing address of the ISA 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 XU, Yan Telephone No. (86-10) 62085794

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

INTERNATIONAL SEARCH REPORT
 Information on patent family members

 International application No.
 PCT/CN2015/070165

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 103956004 A	30 July 2014	None	
CN 102556714 A	11 July 2012	CN 102556714 B	03 September 2014
CN 102324154 A	18 January 2012	US 2014183816 A1	03 July 2014
		WO 2013040931 A1	28 March 2013
		AU 2012313236 A1	02 May 2013
		AU 2012313236 B2	20 November 2014
		EP 2624225 A1	07 August 2013
		US 8789828 B2	29 July 2014
		CN 102324154 B	14 November 2012
CN 103771167 A	07 May 2014	WO 2014063598 A1	01 May 2014
JP 57132284 A	16 August 1982	DD 200138 A5	23 March 1983
		JPS 57132284 A	16 August 1982
		SE 451642 B	19 October 1987
		CH 650601 A5	31 July 1985
		DK 361081 A	13 March 1982
		US 4505471 A	19 March 1985
		YU 193581 A	30 June 1983
		GB 2083933 B	06 February 1985
		AU 7266881 A	18 March 1982
		GB 2083933 A	31 March 1982
		SE 8104120 L	13 March 1982
		DK 148223 B	06 May 1985
		SU 1181554 A3	23 September 1985
		ES 504761 D0	16 August 1982
		BE 889734 A1	16 November 1981
		BR 8105463 A	11 May 1982
		DK 148223 C	30 December 1985
		FR 2490370 B1	29 May 1987

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

5

INTERNATIONAL SEARCH REPORT
Information on patent family membersInternational application No.
PCT/CN2015/070165

10

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
		IT 1137785 B	10 September 1986
		NL 8103564 A	01 April 1982
		AU 546090 B2	15 August 1985
		IT 8123339 D0	03 August 1981
		CA 1179626 A1	18 December 1984
		DE 3034517 C1	02 January 1987
		HU 185655 B	28 March 1985
		ES 8206881 A1	16 November 1982
		FR2490370A1	19 March 1982

15

20

25

30

35

40

45

50

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

55

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201410203320 [0001]