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(54) Title: FLEXIBLE PLASTIC SNAP-RECEIVING SOCKET

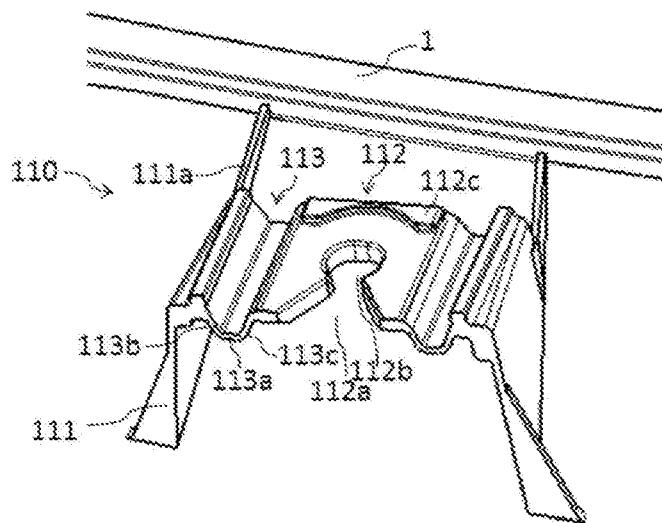


Fig.8

(57) Abstract: A flexible plastic snap-receiving socket (110) comprises a mounting panel (112), two support legs (111) arranged to be spaced apart from each other, and a weakening structure (113). Two opposite ends of the mounting panel are respectively connected to a top end of the support legs via the weakening structure. The weakening structure is U-shaped, and comprises a bottom wall (113a) and a side wall (113b, 113c). The snap-receiving socket can match with the existing plastic snap (120), and realize an effective connection between a vehicle back door trim panel (1) and a vehicle back door (2). Moreover, in a high-temperature or low-temperature ambient environment, the snap-receiving socket can ensure a good appearance matching between the vehicle back door trim panel and the vehicle back door in an installed state.

## Flexible Plastic Snap-receiving socket

### Description

#### Technical Field

The present invention relates to installation of a vehicle outer panel, and more particularly to a flexible plastic snap-receiving socket.

#### Background Art

Fig. 1 is a schematic view illustrating the installation of a back door trim panel of a vehicle, wherein the vehicle back door trim panel 1 is mounted to a vehicle back door 2. Fig. 2 illustrates the structure of the vehicle back door 2, Figs. 3 and 4 illustrate the structure of the vehicle back door trim panel 1, and Fig. 5 illustrates the mounting structure of the vehicle back door trim panel 1 and the vehicle back door 2. In particular, the vehicle back door trim panel 1 is provided on the back with a plurality of plastic snap-receiving sockets 11 (e.g., seven plastic snap-receiving sockets are provided, as shown in Fig. 4), while the vehicle back door 2 is provided with a plurality of plastic snaps 12 in the corresponding position, so that the vehicle back door trim panel 1 is fixedly mounted onto the vehicle back door 2 by means of snap fitting between the plastic snaps 12 and the plastic snap-receiving sockets 11. Typically, since the vehicle back door trim panel 1 is made of a plastic material, whereas the vehicle back door 2 is made of a metallic material, the vehicle back door trim panel 1, in the installed state as shown in Fig. 1, will expand or contract in a high-temperature or low-temperature ambient environment. The difference of the two materials leads to the inconsistency of the stretching amount of the two parts, which in turn results in poor matching between the vehicle back door trim panel 1 and its peripheral parts such as a vehicle rear windshield 3 above the vehicle back door trim panel 1, a side panel 4 and a taillight 5 at the side of the vehicle back door trim panel 1, as shown in Fig. 1. To be specific, after the plastic snap 12 is fittingly engaged with

the plastic snap-receiving socket 11, as shown in Fig. 5, the vehicle back door trim panel 1 generates internal stress due to contraction at a low-temperature state, thereby rendering the plastic snap-receiving socket broken at its root; and the vehicle back door trim panel 1 interferes with the side panel 4 and taillights 5 due to expansion at a high-temperature state, thereby rendering the appearance surface of a vehicle fluctuated.

### **Summary of the Invention**

To solve the problem in the prior art that the installation structure of a vehicle outer panel tends to cause a poor matching, the present invention is intended to provide a flexible plastic snap-receiving socket.

The flexible plastic snap-receiving socket according to the present invention comprises:

- a mounting panel (112),
- support legs (111), arranged to be spaced apart from each other, and
- a weakening structure (113),

wherein the support legs (111) are connected to the mounting panel (112) via the weakening structure (113).

The weakening structure is a flexible structure, that is to say that the weakening structure is flexible compared to the other portions of the snap-receiving socket. In other words, the weakening structure has a lower resistance to deformation than the other portions of the snap-receiving socket for both extending so as to accompany the expansion of the outer panel at a high-temperature state and retracting / folding so as to accompany the contraction of the outer panel at a low-temperature state.

The flexible plastic snap-receiving socket is configured to be arranged on an outer panel of a vehicle and to receive a snap, being configured to be arranged on a structural part of the vehicle, for a snap-fit engagement, such that the outer panel can be fixed on the structural part of the vehicle.

In a preferred embodiment, the weakening structure is an U-shaped weakening

structure and comprises a bottom wall and a side wall.

In a preferred embodiment, the support leg comprises a connecting structure on a lateral surface, through which the flexible plastic snap-receiving socket is connected with an outer panel of a vehicle.

In a preferred embodiment, the flexible plastic snap-receiving socket and the vehicle outer panel are formed in a one-piece structure.

Advantageously, the side walls comprise a first side wall and a second side wall, arranged to be opposite to each other, and the two opposite ends of the bottom wall are respectively connected with a bottom end of the first and second side walls.

Advantageously, the support leg is connected with a top end of the first side wall, and the mounting panel is connected with a top end of the second side wall.

In a preferred embodiment, the mounting panel comprises, at its center, a receiving aperture for receiving a plastic snap.

Advantageously, the mounting panel comprises a guiding slot communicating with the receiving aperture.

Advantageously, the guiding slot is a V-shaped slot.

In a preferred embodiment, the mounting panel is provided, on its top surface, with a position-limiting boss.

In a preferred embodiment, the wall thickness of the weakening structure is less than that of the mounting panel.

The flexible plastic snap-receiving socket provided by the present invention can match with the existing plastic snap, and realize an effective connection between a vehicle outer panel and a vehicle structural part. Moreover, in a high-temperature or low-temperature ambient environment, the flexible plastic snap-receiving socket provided by the present invention can ensure a good appearance matching between the vehicle outer panel and the vehicle structural part in an installed state.

### **Brief Description of the Drawings**

Fig. 1 is a schematic view illustrating an installation environment of a vehicle back

door trim panel;

Fig. 2 is a schematic view of a vehicle back door;

Fig. 3 is a front schematic view of a vehicle back door trim panel;

Fig. 4 is a back schematic view of a vehicle back door trim panel;

Fig. 5 is a perspective schematic view of a prior art installation structure;

Fig. 6 is a perspective schematic view of an installation structure according to the present invention;

Fig. 7 is an exploded view of Fig. 6; and

Fig. 8 is a structural schematic view of a flexible plastic snap-receiving socket according to the present invention.

### **Detailed Description of the Preferred Embodiments**

The preferred embodiments of the present invention will be provided and described in detail with reference to the drawings.

Figs. 6 and 7 illustrate the installation structure according to the present invention, and Fig. 8 illustrates a flexible plastic snap-receiving socket 110 of the installation structure. Similar to the prior art, a vehicle back door trim panel 1 is provided on the back with a plurality of flexible plastic snap-receiving sockets 110, while a vehicle back door 2 is provided with a plurality of plastic snaps 120 in the corresponding position, so that the vehicle back door trim panel 1 is fixedly mounted onto the vehicle back door 2 by means of snap fit between the plastic snaps 120 and the flexible plastic snap-receiving sockets 110, wherein the plastic snap 120 is completely identical with the prior-art plastic snap 12 (see Fig. 5), and they are also identical in terms of the way to slide into the plastic snap-receiving socket, which will not be reiterated herein.

Different from the prior art, the flexible plastic snap-receiving socket 110 provided by the present invention is connected with the vehicle back door trim panel 1 only by two support legs 111. To be specific, the flexible plastic snap-receiving socket 110 comprises two support legs 111, arranged to be spaced apart from each other, and two

opposite ends of a mounting panel 112 are respectively connected to a top end of the support legs 111 via a weakening structure 113. The support leg 111 has a connecting structure 111a on a lateral surface, through which the flexible plastic snap-receiving socket 110 and the vehicle back door trim panel 1 integrally form one piece, thereby reducing the cost of the vehicle back door trim panel 1. The weakening structure 113 is shown as a U-shaped weakening structure comprising a bottom wall 113a, a first side wall 113b and a second side wall 113c, arranged be opposite to each other. Two opposite ends of the bottom wall 113a are respectively connected with a bottom end of the first and second side walls 113b, 113c. The support leg 111 is connected with a top end of the first side wall 113b, and the mounting panel 112 is connected with a top end of the second side wall 113c. The mounting panel 112 has a guiding slot 112a and a receiving aperture 112b which is in communication with the guiding slot 112a, so as to guide the plastic snap 120 (see Fig. 7) to enter into the receiving aperture 112b along the V-shaped guiding slot 112a, thereby allowing the snap engagement between the plastic snap 120 and the flexible plastic snap-receiving socket 110. Moreover, the mounting panel 112 is also provided on its top surface with a boss 112c, which forms a position-limiting part to the plastic snap 120, thereby helping to ensure that the plastic snap 120 is assembled in position. In the embodiment, the wall thickness of the weakening structure 113 (the bottom wall 113a and side walls 113b, 113c) is less than that of the mounting panel 112, thereby facilitating deformation under stress.

The flexible plastic snap-receiving socket 110 provided by the present invention can match with the current plastic snap to realize an effective connection between the vehicle back door trim panel 1 and the vehicle back door 2. Since the flexible plastic snap-receiving socket 110 provided by the present invention is connected with the vehicle back door trim panel 1 only by two support legs 111, and the two opposite ends of the mounting panel 112 are respectively connected to the support legs 111 via the weakening structure 113, the poor matching problem of the installation structure of the vehicle back door trim panel can be solved. To be specific, at a low-temperature state, the internal stress, resulting from the contraction of the vehicle back door trim

panel 1, will be buffered by the weakening structure 113, thus will not be completely transmitted to the flexible plastic snap-receiving socket 110, thereby avoiding the fracture risk of the flexible plastic snap-receiving socket 110, and meanwhile marks due to contraction on the corresponding outer surface of the flexible plastic snap-receiving socket 110. At a high-temperature state, the weakening structure 113 tends to extend itself so as to accompany the expansion of the vehicle back door trim panel 1, thereby avoiding ripples on a vehicle outer surface. As a result, the flexible plastic snap-receiving socket 110 provided by the present invention can realize effective connection and meanwhile guarantee good appearance matching. In other words, the weakening structure 113 tends to extend itself so as to accompany the expansion of the outer panel 1, which is very different from the expansion of the structural part 2, and thus to compensate the differential of expansion. Accordingly, this differential of expansion has no negative effect on the appearance of the outer panel 1.

The above is only the preferred embodiments of the present invention and is not intended to limit the scope of the present invention. Variations can be also be made to the embodiments of the present invention, that is, any simple and equivalent variations and modifications made according to the claims and description of the present application for invention fall into the protection scope defined in the claims of the present invention. Those that are not described in detail herein are customary technical content.

## Claims

1. A flexible plastic snap-receiving socket (110), characterized in that the flexible plastic snap-receiving socket comprises:
  - a mounting panel (112),
  - support legs (111), arranged to be spaced apart from each other, and
  - a weakening structure (113),wherein the support legs (111) are connected to the mounting panel (112) via the weakening structure (113).
2. The flexible plastic snap-receiving socket (110) according to the previous claim, wherein the weakening structure (113) is flexible compared to the other portions of the snap-receiving socket.
3. The flexible plastic snap-receiving socket (110) according to any one of the previous claims, wherein the flexible plastic snap-receiving socket is configured to be arranged on an outer panel (1) of a vehicle and to receive a snap (120), the snap (120) being configured to be arranged on a structural part (2) of the vehicle, for a snap-fit engagement, such that the outer panel (1) can be fixed on the structural part (2) of the vehicle.
4. The flexible plastic snap-receiving socket (110) according to the previous claim, wherein the outer panel (1) is a vehicle back door trim panel, and the structural part (2) is a vehicle back door.
5. The flexible plastic snap-receiving socket (110) according to any one of the previous claims, wherein the weakening structure (113) is an U-shaped weakening structure and comprises a bottom wall (113a) and a side wall (113b, 113c).
6. The flexible plastic snap-receiving socket (110) according to any one of the previous claims, wherein the support leg (111) comprises a connecting structure

- (111a) on a lateral surface, through which the flexible plastic snap-receiving socket (110) is connected with an outer panel (1) of a vehicle.
7. The flexible plastic snap-receiving socket (110) according to any one of the previous claims, wherein the flexible plastic snap-receiving socket (110) and the outer panel (1) are formed in a one-piece structure.
  8. The flexible plastic snap-receiving socket (110) according to claim 5, wherein the side walls comprise a first side wall (113b) and a second side wall (113c), arranged to be opposite to each other, and that two opposite ends of the bottom wall (113a) are respectively connected with a bottom end of the first and second side walls (113b, 113c).
  9. The flexible plastic snap-receiving socket (110) according to the previous claim, wherein the support leg (111) is connected with a top end of the first side wall (113b), and the mounting panel (112) is connected with a top end of the second side wall (113c).
  10. The flexible plastic snap-receiving socket (110) according to any one of the previous claims, wherein the mounting panel (112) comprises, at its center, a receiving aperture (112b) for receiving a plastic snap (120).
  11. The flexible plastic snap-receiving socket (110) according to the previous claim, wherein the mounting panel (112) comprises a guiding slot (112a), communicating with the receiving aperture (112b).
  12. The flexible plastic snap-receiving socket (110) according to the previous claim, wherein the guiding slot (112a) is a V-shaped slot.

13. The flexible plastic snap-receiving socket (110) according to any one of the previous claims, wherein the mounting panel (112) is provided, on its top surface, with a position-limiting boss (112c).
  
14. The flexible plastic snap-receiving socket (110) according to any one of the previous claims, wherein the wall thickness of the weakening structure (113) is less than that of the mounting panel (112).

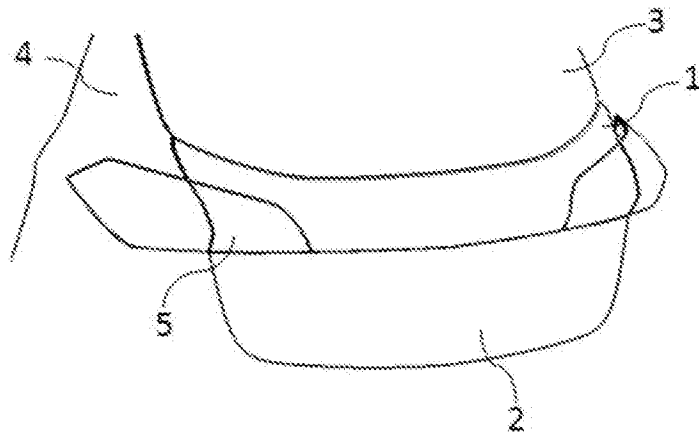


Fig.1

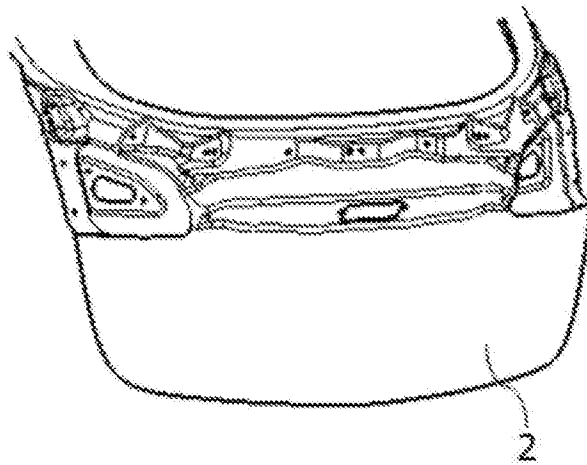


Fig.2



Fig.3

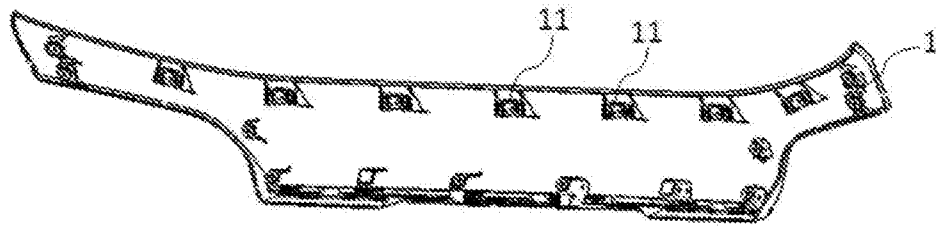


Fig.4

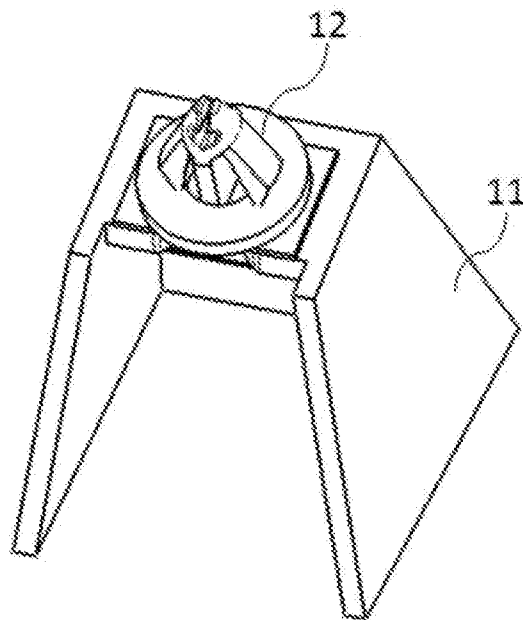


Fig.5

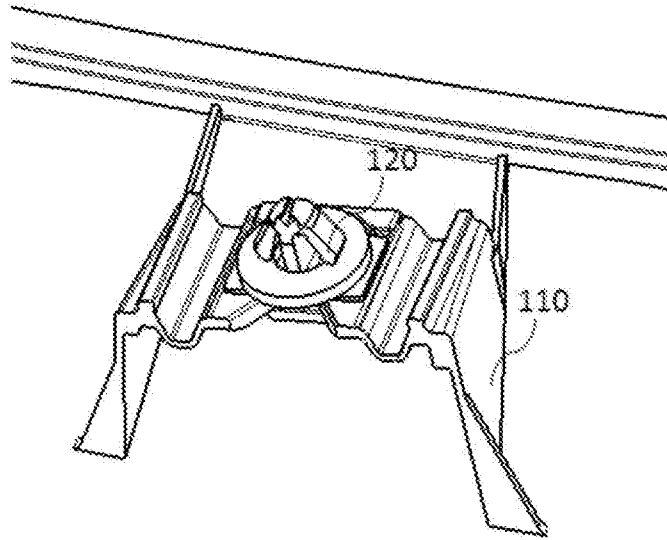


Fig.6

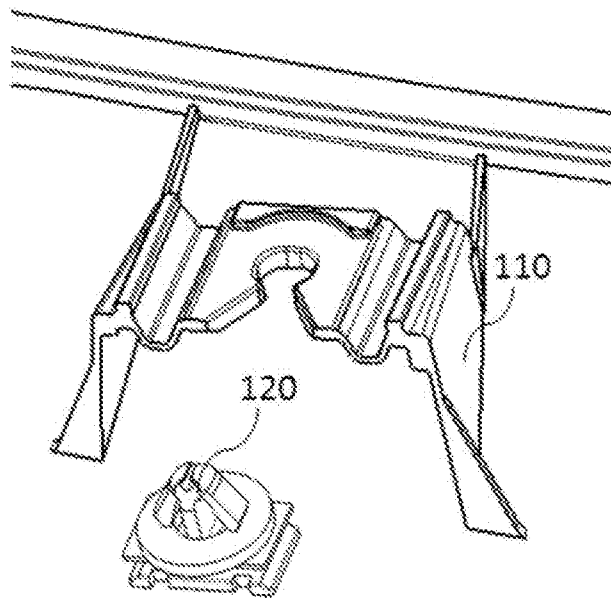


Fig.7

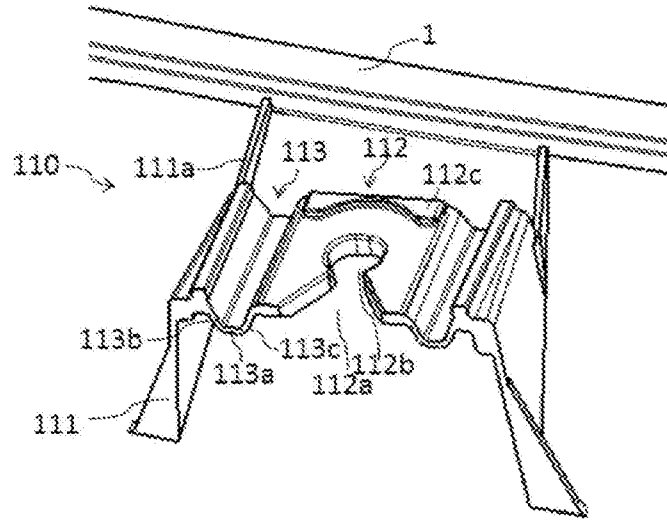


Fig.8

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2017/078033

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
B60R 13/02(2006.01)i		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
B60R		
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)		
CNTXT;SIPOABS;TWTXT;VEN;CNKI:snap, clamp, socket, support+, engag+, elastic+, contraction, expansion, trim, plate, panel, door, metal, weaken+, temperature		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 105691324 A (YANFENG PLASTIC OMNIUM AUTOMOTIVE EXTERIOR SYSTEMS CO., LTD.) 22 June 2016 (2016-06-22) description, paragraphs [0024]-[0026] and figures 1-8	1-14
PX	CN 205417438 U (YANFENG PLASTIC OMNIUM AUTOMOTIVE EXTERIOR SYSTEMS CO., LTD.) 03 August 2016 (2016-08-03) description, paragraphs [0024]-[0026] and figures 1-8	1-14
X	CN 101312853 A (ITW AUTOMOTIVE ITALIA S.R.L. CON UNICO SOCIO.) 26 November 2008 (2008-11-26) description, page 2 line 1 to page 6 line 3 and figures 1, 5	1-14
A	CN 204340912 U (JIANGYIN XIETONG AUTOMOBILE ACCESSORY CO., LTD.) 20 May 2015 (2015-05-20) the whole document	1-14
A	DE 4211072 C2 (VOLKSWAGEN AG) 03 March 1994 (1994-03-03) the whole document	1-14
A	CN 202187983 U (SAIC MOTOR CORPORATION LTD.) 11 April 2012 (2012-04-11) the whole document	1-14
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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
16 May 2017		05 June 2017
Name and mailing address of the ISA/CN		Authorized officer
STATE INTELLECTUAL PROPERTY OFFICE OF THE P.R.CHINA 6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088 China		SUN, Lanxiang
Facsimile No. (86-10)62019451		Telephone No. (86-10)62089249

**INTERNATIONAL SEARCH REPORT**  
**Information on patent family members**

International application No. <b>PCT/CN2017/078033</b>
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Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 105691324 A	22 June 2016	None	
CN 205417438 U	03 August 2016	None	
CN 101312853 A	26 November 2008	WO 2007069057 A2	21 June 2007
		EP 1968817 A2	17 September 2008
		IT TO20050874 A1	16 June 2007
		US 2008260454 A1	23 October 2008
CN 204340912 U	20 May 2015	None	
DE 4211072 C2	03 March 1994	None	
CN 202187983 U	11 April 2012	None	