



(51) International Patent Classification:

B60R 13/04 (2006.01) *B60R 19/52* (2006.01)

(21) International Application Number:

PCT/CN2017/113076

(22) International Filing Date:

27 November 2017 (27.11.2017)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

201611064325.1 28 November 2016 (28.11.2016) CN

(71) Applicants: **YANFENG PLASTIC OMNIUM AUTOMOTIVE EXTERIOR SYSTEMS CO., LTD.** [CN/CN]; No. 540, Moyu Road, Jiading District, Shanghai 201805 (CN). **COMPAGNIE PLASTIC OMNIUM** [FR/FR]; 19, boulevard Jules Carteret, 69007 Lyon (FR).

(72) Inventors: **GUI, Xiaogang**; No. 540, Moyu Road, Jiading District, Shanghai 201805 (CN). **ZHANG, Zhiyao**; No. 540, Moyu Road, Jiading District, Shanghai 201805 (CN).

(74) Agent: **LLR CHINA PATENT**; Room D-606, Guojicaijing Center, No. 87, Xisanhuanbeilu, Haidian District, Beijing 100089 (CN).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,

OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: AN ASSEMBLY STRUCTURE

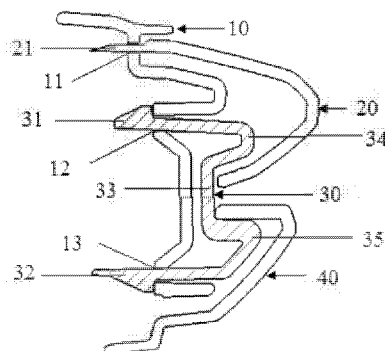


Fig. 2B

(57) Abstract: An assembly structure is provided. The assembly structure comprises a grille (10); a plated trim (20) fixedly connected to the grille (10); a decorative piece (30) fixedly connected to the grille (10); and a bumper (40) fixedly connected to the grille (10) by passing through the decorative piece (30). The decorative piece (30) is partially exposed to the exterior between the plated trim (20) and the bumper (40). The decorative piece (30) has an M-shaped self-adaptive structure, which guarantees good fitting properties between the grille, the plated trim, the decorative piece and the bumper and absorbs the tolerances.



An assembly Structure

Field of Invention

The present invention relates to the field of exterior decoration for vehicles, and more particularly to an assembly structure.

Background

With the deepening of China's reform, China and foreign countries enhance their cooperation in the vehicle industry and develop more projects on the globe simultaneously. In order to occupy a larger market share in China, some well-known automobile enterprises introduce the world most fashionable styles into China, such as a light band having the effect of "Motion of Soul" added between a grille and a bumper, which also provides Chinese enterprises with opportunities to enter into overseas market.

Current technical solutions used in foreign countries are shown in Figs. 1, 1A and 1B, wherein a grille 1 and a bumper 4 are connected by a screw 5, the grille 1 and a decorative piece 3 are also connected by a screw 6, and there is no connection between a plated trim 2 and the decorative piece 3, or between the bumper 4 and the decorative piece 3.

Thus, the prior-art technical solution has the following drawbacks: a. since there is no connecting structure between the plated trim and the decorative piece or between the bumper and the decorative piece, the gap L between the plated trim and the decorative piece, as well as between the bumper and the decorative piece, cannot be controlled; b. since the bumper and the grille are connected by the screw, a protrusive rod have to be arranged on the bumper, which leaves a shrink mark on the surface of the bumper; and c. since the bumper and the grille, as well as the decorative piece and the grille, are respectively connected by the screw, it would increase the cost.

Moreover, in the prior art, generally speaking, a headlight is first assembled onto a vehicle body, and then the grille 1, the plated trim 2, the decorative piece 3 and the bumper 4 are assembled as a front bumper assembly onto the vehicle body. However, it is very hard to control the uniformity of the gap between the front bumper assembly and left and right headlights in Y direction.

Summary

The object of the present invention is to provide an assembly structure so as to solve the problems in the prior art, such as uncontrollable gap between the plated trim and the bumper of the assembly structure, increased cost, and uncontrollable uniformity of the gap between the front bumper assembly and left and right headlights in Y direction.

To solve the above technical problems, the present invention adopts the following technical solutions:

According to the present invention, there is provided an assembly structure comprising a grille, a plated trim fixedly connected to the grille, a decorative piece fixedly connected to the grille and a bumper fixedly connected to the grille by passing through the decorative piece, wherein the decorative piece is partially exposed to the exterior between the plated trim and the bumper. Therefore, the plated trim, the decorative piece and the bumper are relatively fixed to each other so that the gap between the plated trim and the bumper, i.e. the exposed width of the decorative piece is controllable.

The decorative piece has an M-shaped self-adaptive structure which comprises a recess and two protrusions separated by the recess.

The recess of the decorative piece has a plane structure.

The recess of the decorative piece is partially exposed to the exterior between the plated trim and the bumper.

The visible width of the exposed part of the recess of the decorative piece which is exposed between the plated trim and the bumper ranges from 4.0mm to 5.0mm, most preferably 4.5mm.

Alternatively, the decorative piece is a coloured piece, which is a light plate piece mainly for enhancing the colour gradation in that area. Of course, it shall be understood that the decorative piece is not limited to a coloured piece, and may be a part made of other material.

Preferably, the grille having a first, a second, a third and a fourth snap-fit hole; the plated trim having a first snap and being fixedly connected to the grille by mating the first snap with the first snap-fit hole; the decorative piece having a second snap and a third snap, the decorative piece being fixedly connected to the grille by mating the second snap with the second snap-fit hole and mating the third snap with the third snap-fit hole; and the bumper having a fourth snap which

passes through the decorative piece to be fixedly connected to the grille by mating the fourth snap with the fourth snap-fit hole.

The second snap and the third snap are respectively located at the free ends of the protrusions of the decorative piece.

- 5 The plated trim also has a fifth snap and the grille has a fifth snap-fit hole. The plated trim passes through the decorative piece to be fixedly connected to the grille by mating the fifth snap with the fifth snap-fit hole.

- The bumper is provided at its lower end with a protrusively extending insert, and the grille has a sixth insert-fit hole. The bumper is fastened to the grille by mating the insert with the sixth insert-fit hole.
- 10

Preferably, the assembly structure also comprises a headlight, wherein the bumper has a protruding rod, the decorative piece and the grille are respectively provided with screw holes, and the bumper, the decorative piece and the grille are fastened by a screw sequentially penetrating into the protruding rod and the screw holes.

- 15 The plated trim has a pin, and the grille has a pin hole mating with the pin.

The assembly structure according to the present invention has the following advantageous effects over the prior art: by providing a decorative piece having an M-shaped self-adaptive structure, the assembly structure guarantees good fitting properties between the grille, the plated trim, the decorative piece and the bumper and absorbs the tolerances, thereby making it possible to control the visible width of the decorative piece exposed between the plated trim and the bumper; all the above parts are connected by snaps, instead of screws used in the prior art, which greatly reduces the cost; additionally, the uniformity of the gap between the front bumper assembly and left and right headlights in Y direction can be ensured.

20

25 **Brief description of the figures**

Fig. 1 is a structural schematic view of an assembly structure in the prior art;

Fig. 1A is a cross-sectional view taken along the line A-A in Fig. 1;

Fig. 1B is a cross-sectional view taken along the line B-B in Fig. 1;

Fig. 2 is a structural schematic view of an assembly structure according to a preferred embodiment of the present invention;

30

Fig. 2A is a cross-sectional view taken along the line C-C in Fig. 2;

Fig. 2B is a cross-sectional view taken along the line D-D in Fig. 2;

Fig. 2C is a cross-sectional view taken along the line E-E in Fig. 2;

Fig. 2D is a cross-sectional view taken along the line F-F in Fig. 2;

- 5 Fig. 3 is a structural schematic view of an assembly structure in the area of a headlight according to a preferred embodiment of the present invention; and

Fig. 3A is a cross-sectional view taken along the line G-G in Fig. 3.

Description of embodiments

- 10 The preferred embodiments of the present invention will be described in detail with reference to the drawings, so as to better describe the functions and characteristics of the present invention.

According to a first preferred embodiment of the present invention, there is provided an assembly structure, as shown in Fig. 2. The assembly structure mainly comprises a grille 10, a plated trim 20, a decorative piece 30 and a bumper 40.

- 15 The grille 10 has a first snap-fit hole 11, a second snap-fit hole 12, a third snap-fit hole 13 (see Fig. 2B), a fourth snap-fit hole 14 (see Fig. 2C) and a fifth snap-fit hole 15 (see Fig. 2D). The plated trim 20 has a first snap 21 (see Fig. 2B) and is fixedly connected to the grille 10 by mating the first snap 21 with the first snap-fit hole 11. The decorative piece 30 has an M-shaped self-adaptive structure (see Figs. 2A and 2B) and has a second snap 31 and a third snap 32. The decorative piece 30 is
20 fixedly connected to the grille 10 by mating the second snap 31 with the second snap-fit hole 12 and mating the third snap 32 with the third snap-fit hole 13. The bumper 40 has a fourth snap 41 (see Fig. 2C) and passes through the decorative piece 30 to be fixedly connected to the grille 10 by mating the fourth snap 41 with the fourth snap-fit hole 14.

- With reference to Fig. 2B, the M-shaped self-adaptive structure of the decorative piece 30
25 comprises a recess 33 and two protrusions 34, 35 separated by the recess 33. The second snap 31 and the third snap 32 are respectively located at the free ends of the protrusions 34, 35 of the decorative piece 30. The recess 33 of the decorative piece 30 has a plane structure and is partially exposed to the exterior between the plated trim 20 and the bumper 40.

According to a preferred embodiment of the present invention, the visible width L' of the exposed part of the recess 33 of the decorative piece 30 which is exposed between the plated trim 20 and the bumper 40 ranges from 4.0mm to 5.0mm, most preferably 4.5mm.

According to the preferred embodiment, with reference to Fig. 2D, the plated trim 20 also has a fifth snap 22. The plated trim 20 passes through the decorative piece 30 to be fixedly connected to the grille 10 by mating the fifth snap 22 with the fifth snap-fit hole 15.

In order to effectively control the matching between the bumper 40 and the plated trim 20 and to prevent the turnover of the bumper 40, the grille 10 is also provided with an insert-fit hole 16, and the bumper 40 is provided at its lower end with a protrusively extending insert 42 (see Fig. 2A). The bumper 40 is fastened to the grille 10 by mating the insert 42 with the insert-fit hole 16, thereby completely preventing the bumper 40 from turning over.

In the assembly structure of the decorative piece provided in the preferred embodiment of the present invention, the decorative piece 30 is designed to have an M-shaped self-adaptive structure. The elasticity of the M-shaped self-adaptive structure *per se* controls the effective connection between the plated trim 20 and the decorative piece 30, as well as between the bumper 40 and the decorative piece 30. The characteristics of the M shape *per se* help to absorb the assembly error and manufacturing error between the plated trim 20, the bumper 40 and the grille 10 so as to effectively control the matching between them.

The plated trim 20 is matched with the grille 10 in the +Z direction, with the bumper 40 in the -Z direction, and with the decorative piece 30 in the +X direction, whereas the bumper 40 is matched with the plated trim 20 in the +Z direction and with the decorative piece 30 in the +X direction.

Thus, according to a second preferred embodiment of the present invention, there is also provided an assembly structure in the area of a headlight, as shown in Fig. 3.

In this embodiment, the grille 10, the plated trim 20, the decorative piece 30 and the bumper 40 have the same assembly structure as that of the first embodiment. Besides, the bumper 40 further comprises a protrusive rod 43, whereas the decorative piece 30 and the grille 10 are respectively provided with screw holes 35, 17. The screw 60 sequentially penetrates into the protrusive rod 43 and the screw holes 35, 17 to fasten the bumper 40, the decorative piece 30 and the grille 10.

The plated trim 20 further comprises a pin 23, and the grille 10 comprises a pin hole 18 mating with the pin. The pin-hole mating can further control the matching between the grille 10, the plated trim 20, the decorative piece 30, the bumper 40 and the headlight 50.

5 The assembly structure in the area of headlights ensures the uniformity of the gap between the front bumper assembly and left and right headlights in the Y direction.

The above contents are merely preferred embodiments of the present invention and not intended to limit the scope of the present invention. Variations can be made to the above embodiments of the present invention. Any simple and equivalent variation and modification made according to the claims and description of the present invention fall within the protection
10 scope of the claims of the present invention. Conventional techniques are not described in detail in the present invention.

Claims

1. An assembly structure, characterized by comprising:

- a grille (10);

5 - a plated trim (20) fixedly connected to the grille (10);

- a decorative piece (30) fixedly connected to the grille (10); and

- a bumper (40) fixedly connected to the grille (10) by passing through the decorative piece (30),

wherein the decorative piece (30) is partially exposed to the exterior between the plated trim (20) and the bumper (40).

10 2. The assembly structure according to claim 1, wherein the decorative piece (30) has an M-shaped self-adaptive structure comprising a recess (33) and two protrusions (34, 35) separated by the recess (33).

3. The assembly structure according to claim 2, wherein the recess (33) of the decorative piece has a plane structure.

15 4. The assembly structure according to claim 2 or 3, wherein the recess (33) of the decorative piece (30) is partially exposed to the exterior between the plated trim (20) and the bumper (40).

5. The assembly structure according to claim 4, wherein the visible width of the exposed part of the recess of the decorative piece which is exposed between the plated trim (20) and the bumper (40) ranges from 4.0mm to 5.0mm.

20 6. The assembly structure according to anyone one of the preceding claims, wherein the grille (10) having a first (11), a second (12), a third (13) and a fourth (14) snap-fit hole; the plated trim (20) having a first snap (21) and being fixedly connected to the grille (10) by mating the first snap (21) with the first snap-fit hole (11); the decorative piece (30) having a second snap (31) and a third snap (32) and being fixedly connected to the grille (10) by mating the second snap (31) with the
25 second snap-fit hole (12) and mating the third snap (32) with the third snap-fit hole (13); the bumper (40) having a fourth snap (41) which passes through the decorative piece (30) to be fixedly connected to the grille (10) by mating the fourth snap (41) with the fourth snap-fit hole (14).

7. The assembly structure according to claim 6, wherein the second snap (31) and the third snap (32) are respectively located at the free ends of the protrusions (34, 35) of the decorative piece (30).

5 8. The assembly structure according to anyone one of claims 6 and 7, wherein the plated trim (20) also has a fifth snap (22), the grille (10) has a fifth snap-fit hole (15), and the plated trim (20) passes through the decorative piece (30) to be fixedly connected to the grille (10) by mating the fifth snap (22) with the fifth snap-fit hole (15).

10 9. The assembly structure according to anyone one of claims 6 to 8, wherein the bumper (40) is provided at its lower end with a protrusively extending insert (42), the grille (10) has a sixth insert-fit hole (16), and the bumper (40) is fastened to the grille (10) by mating the insert (42) with the sixth insert-fit hole (16).

10. The assembly structure according to anyone one of the preceding claims, wherein the assembly structure also comprises a headlight (50);

15 wherein the bumper has a protruding rod (43), the decorative piece (30) and the grille (10) are respectively provided with screw holes (35, 17), the bumper (40), the decorative piece (30) and the grille (10) are fastened by a screw (60) sequentially penetrating into the protruding rod (43) and the screw holes (35, 17).

11. The assembly structure according to claim 10, wherein the plated trim (20) comprises a pin (23), and the grille (10) comprises a pin hole (18) mating with the pin (23).

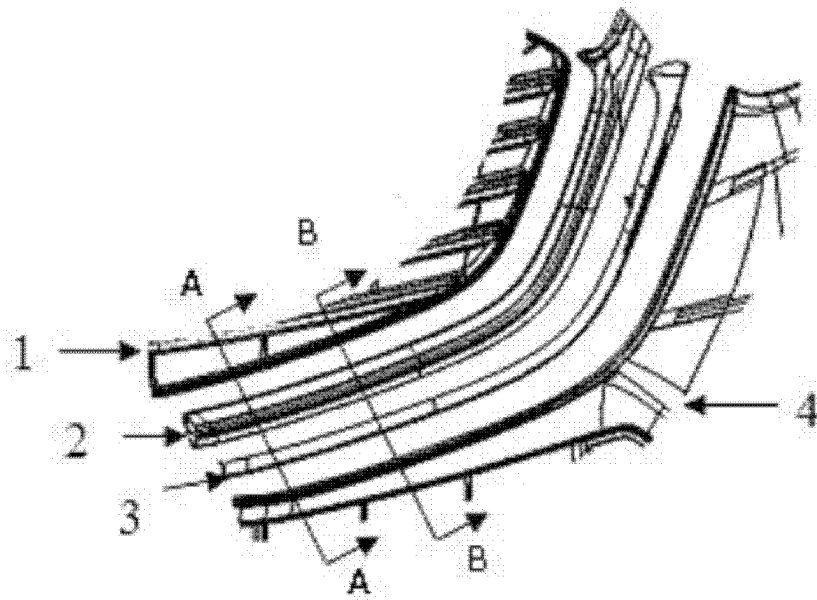


Fig. 1

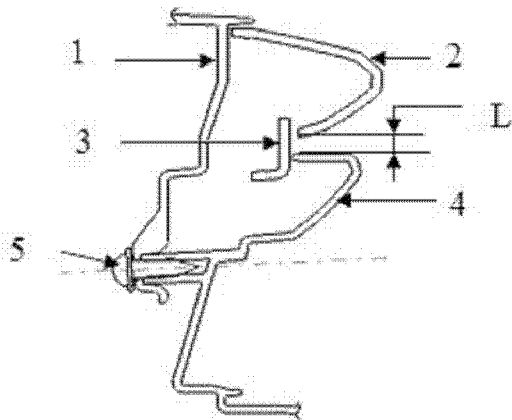


Fig.1A

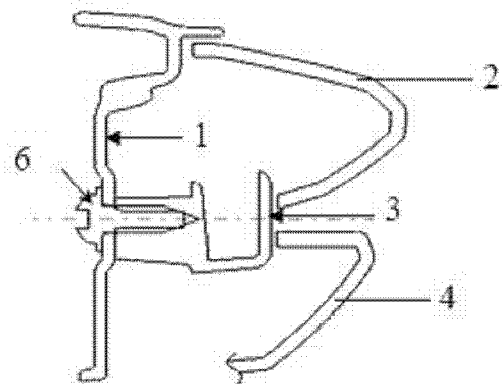


Fig.1B

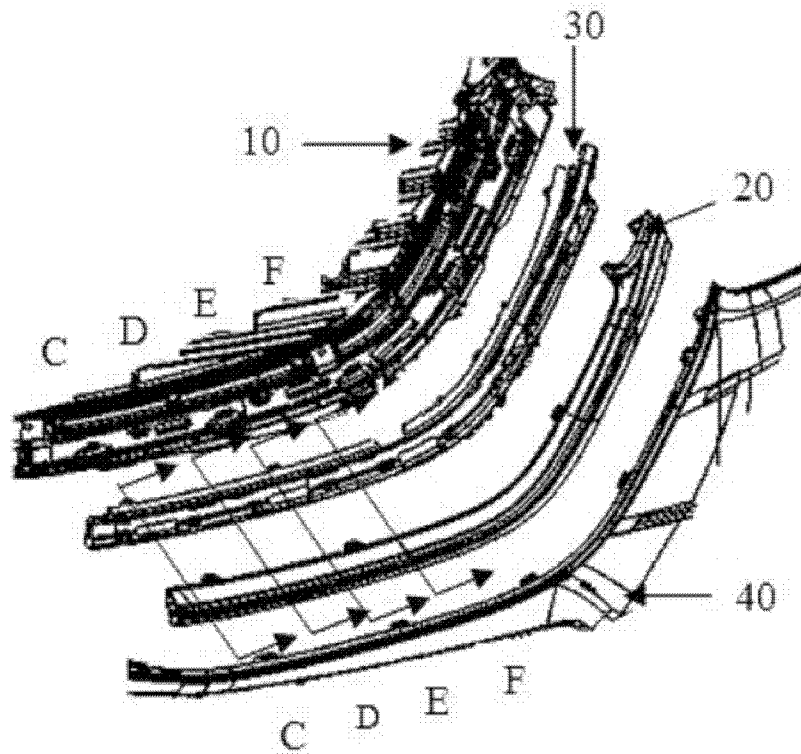


Fig.2

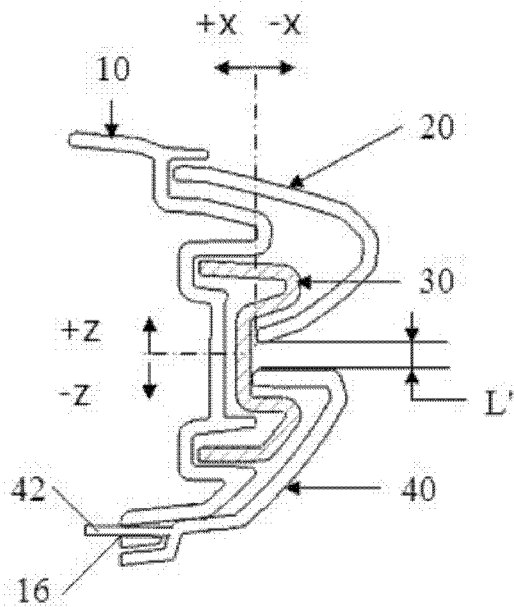


Fig. 2A

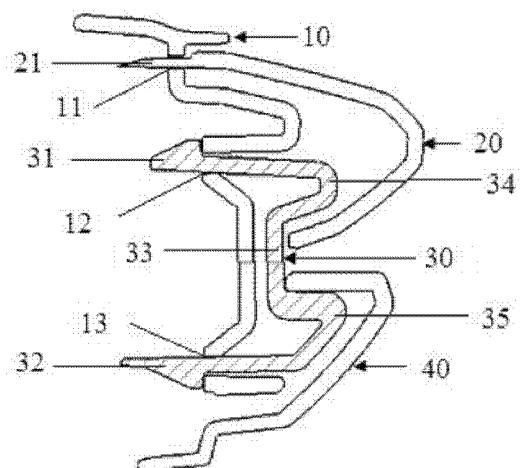


Fig. 2B

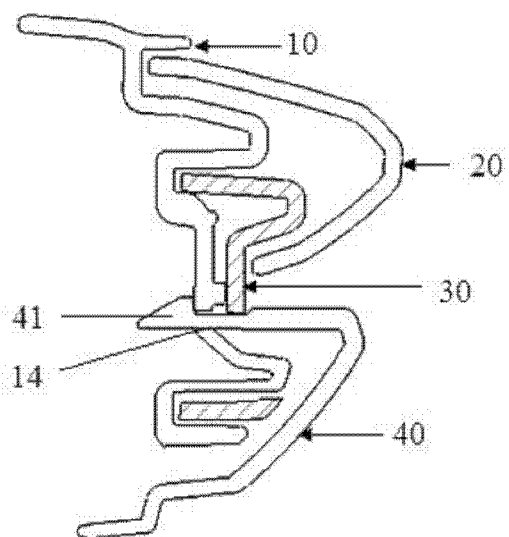


Fig. 2C

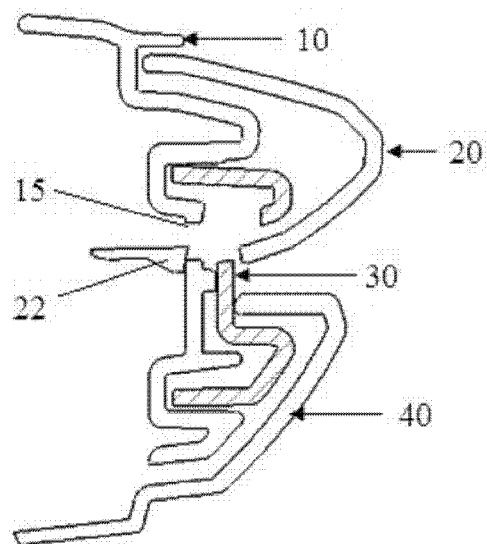


Fig. 2D

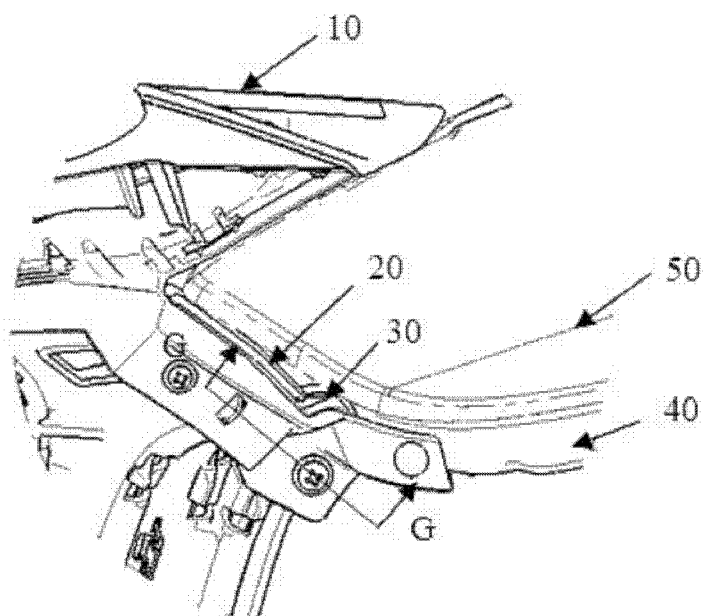


Fig. 3

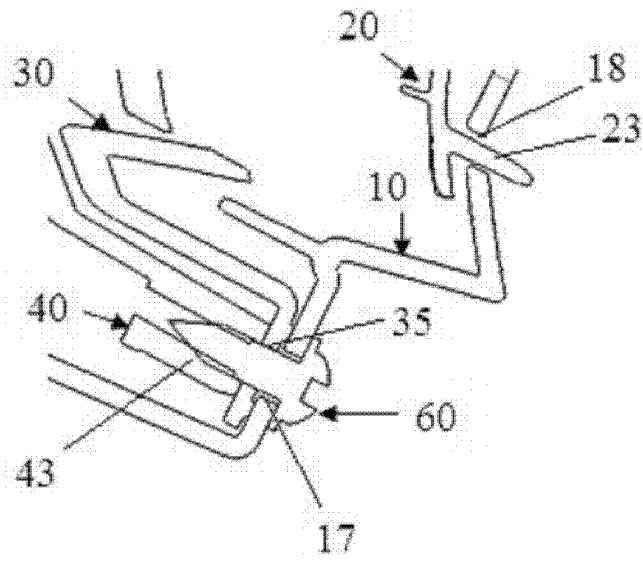


Fig. 3A

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2017/113076

A. CLASSIFICATION OF SUBJECT MATTER

B60R 13/04(2006.01)i; B60R 19/52(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)

B60R13; B60R19

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;VEN;CNKI:grid, girle,ornament,decorative,trim, fascia, bumper, snap, hole

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 106740548 A (YANFENG PLASTIC OMNIUM AUTO EXTERIORS) 31 May 2017 (2017-05-31) description, paragraphs [0031] to [0042], claims 1 to 10 and figures 1 to 3A	1-11
PX	CN 206217794 U (YANFENG PLASTIC OMNIUM AUTO EXTERIORS) 06 June 2017 (2017-06-06) description, paragraphs [0031] to [0042], claims 1 to 10 and figures 1 to 3A	1-11
A	CN 105774725 A (WUHAN LIAOYUAN MOULD PLASTIC CO LTD) 20 July 2016 (2016-07-20) paragraphs [0012] to [0022] and figures 1 to 15	1-11
A	CN 103818325 A (CHONGQING CHANGAN AUTOMOBILE CO LTD) 28 May 2014 (2014-05-28) the whole document	1-11
A	CN 103171506 A (PLASTIC OMNIUM AUTO EXTERIORS SAS) 26 June 2013 (2013-06-26) the whole document	1-11
A	CN 205524036 U (WUHAN HESHENG AUTO PARTS CO LTD) 31 August 2016 (2016-08-31) the whole document	1-11



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

02 February 2018

Date of mailing of the international search report

26 February 2018

Name and mailing address of the ISA/CN

STATE INTELLECTUAL PROPERTY OFFICE OF THE
P.R.CHINA
6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing
100088
China

Authorized officer

ZHAO,Yuxia

Facsimile No. (86-10)62019451

Telephone No. (86-10)62085435

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2017/113076**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2011204680 A1 (FORTIN) 25 August 2011 (2011-08-25) the whole document	1-11
A	US 2007176441 A1 (LAU ET AL.) 02 August 2007 (2007-08-02) the whole document	1-11

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2017/113076

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN	106740548	A	31 May 2017	None	
CN	206217794	U	06 June 2017	None	
CN	105774725	A	20 July 2016	None	
CN	103818325	A	28 May 2014	None	
CN	103171506	A	26 June 2013	None	
CN	205524036	U	31 August 2016	None	
US	2011204680	A1	25 August 2011	None	
US	2007176441	A1	02 August 2007	None	