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

(11) **EP 2 540 177 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.01.2013 Bulletin 2013/01

(51) Int Cl.:
A41F 1/00 *(2006.01)* ***A44B 13/00*** *(2006.01)*

(21) Application number: **12174120.1**

(22) Date of filing: **28.06.2012**

(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

(30) Priority: **01.07.2011 CN 201110184194**

(71) Applicant: **Embry (China) Garments Ltd.**
Buxin Industrial District
Shenzhen
Guangdong (CN)

(72) Inventor: **Cheng, Pik Ho Liza**
N. T. (CN)

(74) Representative: **Davies, Philip**
Haseltine Lake LLP
Redcliff Quay
120 Redcliff Street
Bristol
BS1 6HU (GB)

(54) **Hook and eye fastener**

(57) Embodiments of smart sliding buckles are provided. The embodiments relate to garment accessories, particularly bra buckles. It includes a hooking-prong (1) and a loop-frame (2). The hooking-prong (1) is a flattened hook. The loop-frame (2) is V-shaped. The V-shaped loop-frame (2) includes two bars (21). Lower ends of the bars (21) of the V-shaped loop-frame (2) are curvedly connected, forming an arc (22). Two upper ends of the V-shaped loop-frame (2) connect to fixing rings (4) that can be used to fix the loop-frame (2) on a piece of garment, such as a bra. This V-shaped loop-frame (2) decreases the precision requirement to secure a tie. It allows certain degree of position variation between the hooking-prong (1) and the V-shaped loop-frame (2) to form a tie. Therefore, the embodiments disclosed herein provide the same functions as traditional buckles, yet they provide additional ease of use.

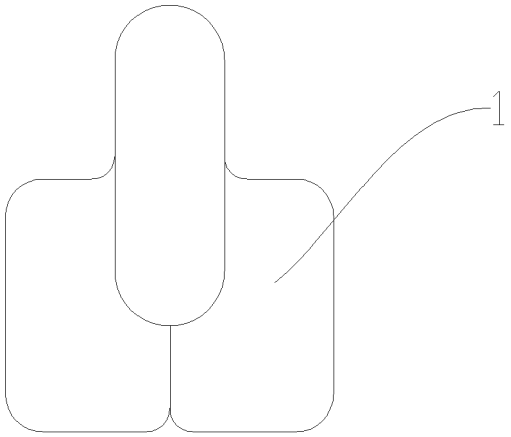


FIG. 1

EP 2 540 177 A1

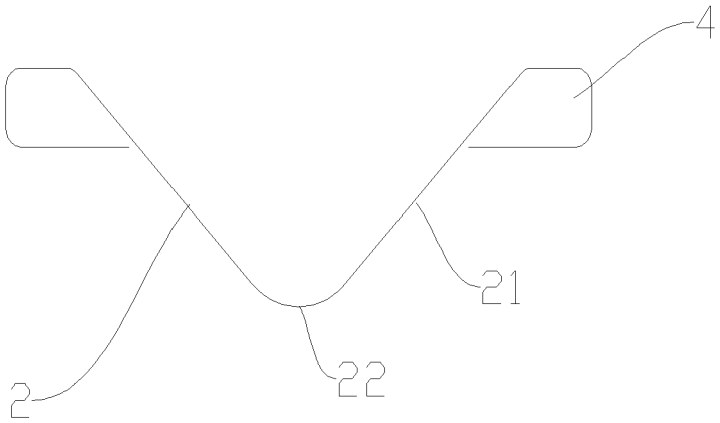


FIG. 2

Description

Field

[0001] The embodiment describes herein a smart sliding buckle that relates to garment accessories, particularly bra buckles.

Background

[0002] Current designs of loop-frames of bra buckles are generally rectangular-shaped, of which a bottom is transitionally connected to form a U-shape loop. There is generally a hooking-prong on one end of a piece of garment that matches with a loop-frame on the other end. While using, a user uses his hands to hook up the hooking-prong and the loop-frame to form a tie. The secured tie is often stable and can be easily unhooked. The hooking-prong and the loop-frame have to spatially match to each other to form a tie. A bra usually has multiple pairs of hooking-prongs and loop-frames. Because the spatial positions of the hooking-prongs have to match with the corresponding loop-frames in a somewhat accurate manner to form a tie, it requires a relatively high level of precision for a user to successfully secure a tie between the hooking-prongs and loop-frames. This requirement of high level of precision incurs high level of difficulty for users. The difficulty is even greater if the hooking-prongs and the loop-frames on a bra locate in a position where a user cannot see. Therefore, current designs of bra buckles cannot provide sufficient convenience for users; instead, they incur great inconvenience.

Summary

[0003] Embodiments herein describe a novel buckle design, a smart sliding buckle, that is relatively easy to use. While forming a tie, a smart sliding buckle can easily form a tie even if the spatial positions of the hooking-prongs and the loop-frames do not match to each other exactly.

[0004] Embodiments may be implemented as follows.

[0005] A smart sliding buckle may include a hooking-prong and a loop-frame. The hooking-prong may be a flattened hook. The loop-frame may be a V-shaped loop-frame. Lower ends of two bars of the V-shaped loop-frame may be curvedly connected, forming an arc. Upper ends of the two bars of the V-shaped loop-frame may connect to fixing rings that can be used to fix the loop-frame on a piece of garment, such as a bra.

[0006] An angle between the two bars of the V-shaped loop-frame may range from 30 to 150 degrees.

[0007] Embodiments decrease the precision requirement to form a tie. While forming a tie, an embodiment allows certain degrees of variations of spatial mis-match between the hooking-prongs and loop-frames. Within the allowed variation of spatial mis-match, users can easily form a tie that has the same effects provided by a traditional bra buckle. The embodiments described herein can increase the ease of use.

Drawings

[0008]

Figure 1 illustrates a structure of the hooking-prong.

Figure 2 illustrates a structure of the loop-frame.

Figure 3 illustrates a schematic view of a pair of mismatched hooking-prong and loop-frame of a smart sliding buckle.

Figure 4 illustrates a force diagram of a pair of mismatched hooking-prong and loop-frame of a smart sliding buckle while in the process of forming a tie.

Figure 5 illustrates a schematic view of a secured tie of a smart sliding buckle.

Detailed Description

[0009] Figure 1, Figure 2, Figure 3, Figure 4, and Figure 5 further disclose the embodiments:

[0010] As shown in Figure 1 and Figure 2, the embodiment includes two major elements: a hooking-prong 1 and a V-shaped loop-frame 2. The hooking-prong 1 is installed at one end of a bra being connected. The V-shaped loop-frame 2 is installed at the other end of the bra being connected. The hooking-prong 1 in this embodiment is a flattened hook. The V-shaped loop-frame 2 in this embodiment includes two bars 21, forming a V-shape. Lower ends of the two bars of the V-shaped loop-frame are curvedly connected, forming an arc 22. Two upper ends of the bars 21 of the V-shaped loop-frame 2 connect to fixing rings 4 that can be used to fix the loop-frame on a piece of garment, such as a bra. An angle between the two bars 21 of the V-shaped loop-frame 2 ranges from 30 to 150 degrees. This angle can vary from one clothing style to another.

[0011] With a traditional bra buckle, if the physical positions of a hooking-prong and a loop-frame do not match to each other in a relatively accurate manner, a tie can be difficult to form. However, with the embodiment described herein, if the hooking-prong 1 and the V-shaped loop-frame 2 do not match to each other precisely, as shown in Figure 3, a tie can still be formed. While in the process of forming a tie, if a certain degree of position mis-match exists between the hooking-prong 1 and the V-shaped loop-frame 2, as in Figure 4, a force F is formed on the V-shaped loop-frame 2. The force F can be broken down to sub-force F_1 and sub-force F_2. Sub-force F_2 is orthogonal to a contacting bar 21 of the V-shaped loop-frame. Sub-force F_1 is parallel to the contacting bar 21 of the V-shaped loop-frame. Sub-force F_1 drags the hooking-prong along the direction of the contacting bar of a

V-shaped loop-frame 21towards the lower arced end of the V-shaped loop-frame 22. Figure 5 shows a secured tie between the hooking-prong and the V-shaped loop-frame. In Figure 5, force F_0 on the hooking-prong is balanced with two counteracting forces provided by the two fixing rings. Each fixing ring provides $0.5F_0$. Thus, a tie is secured. This embodiment illustrates a mechanism that can easily secure a tie without matching the physical positions exactly. This embodiment provides a V-shaped loop-frame 2 structure that guides a mis-matched hooking-prong 1 to a lower arced end 22 of the V-shaped loop-frame 2, securing a tie.

[0012] The open end of the V-shaped loop-frame 2 is generally bigger than a loop-frame of a traditional bra buckle. This may provide additional ease of use to secure a tie between the hooking-prong 1 and the V-shaped loop-frame 2.

Claims

1. A smart sliding buckle, comprising:

a hooking-prong; and
a loop-frame;

wherein, the hooking-prong is a flattened hook; the loop-frame is V-shaped; the V-shaped loop-frame therein includes two bars; lower ends of the two bars of the V-shaped loop-frame are curvedly connected, forming an arc; upper ends of the two bars of the V-shaped loop-frame connect to fixing rings that are used to fix the loop-frame on a piece of garment.

2. The smart sliding buckle of claim 1 wherein an angle between the two bars of the V-shaped loop-frame ranges from 30 to 150 degrees.

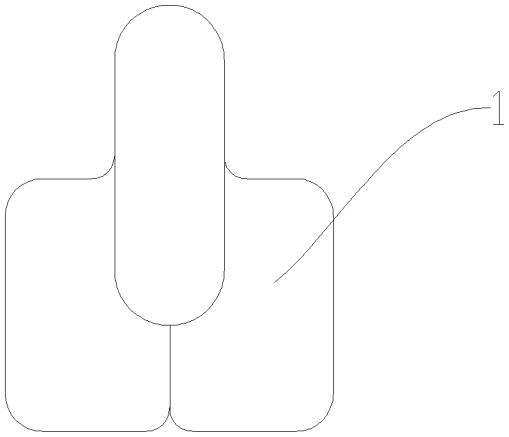


FIG. 1

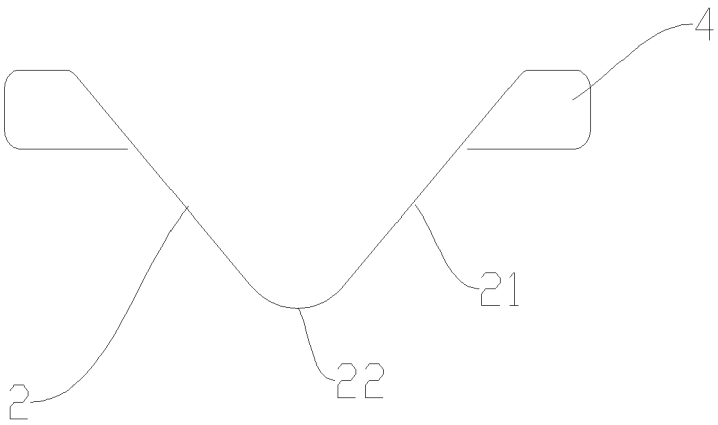


FIG. 2

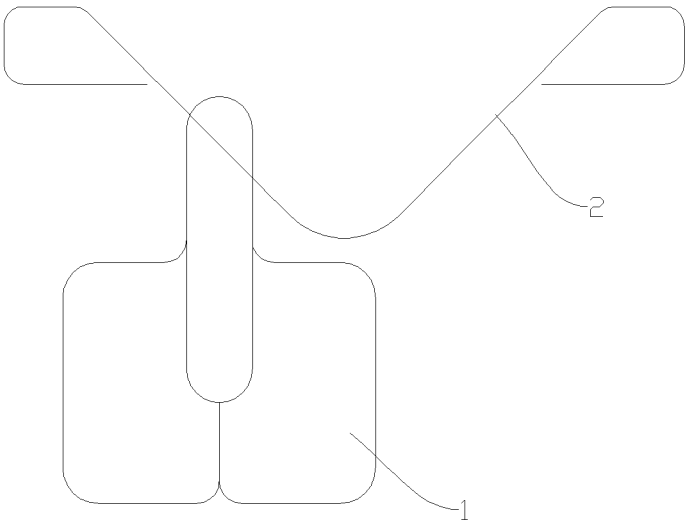


FIG. 3

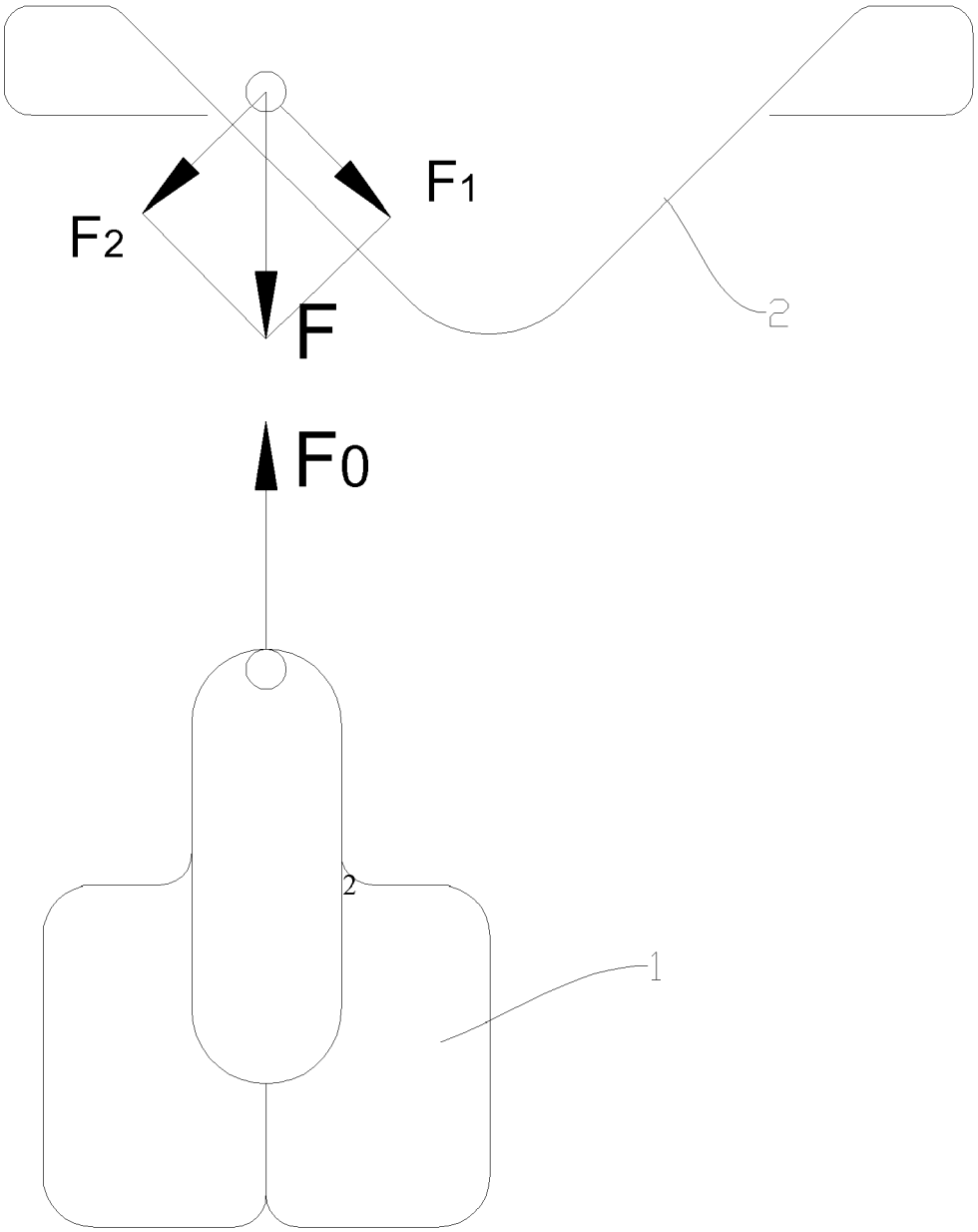


FIG. 4

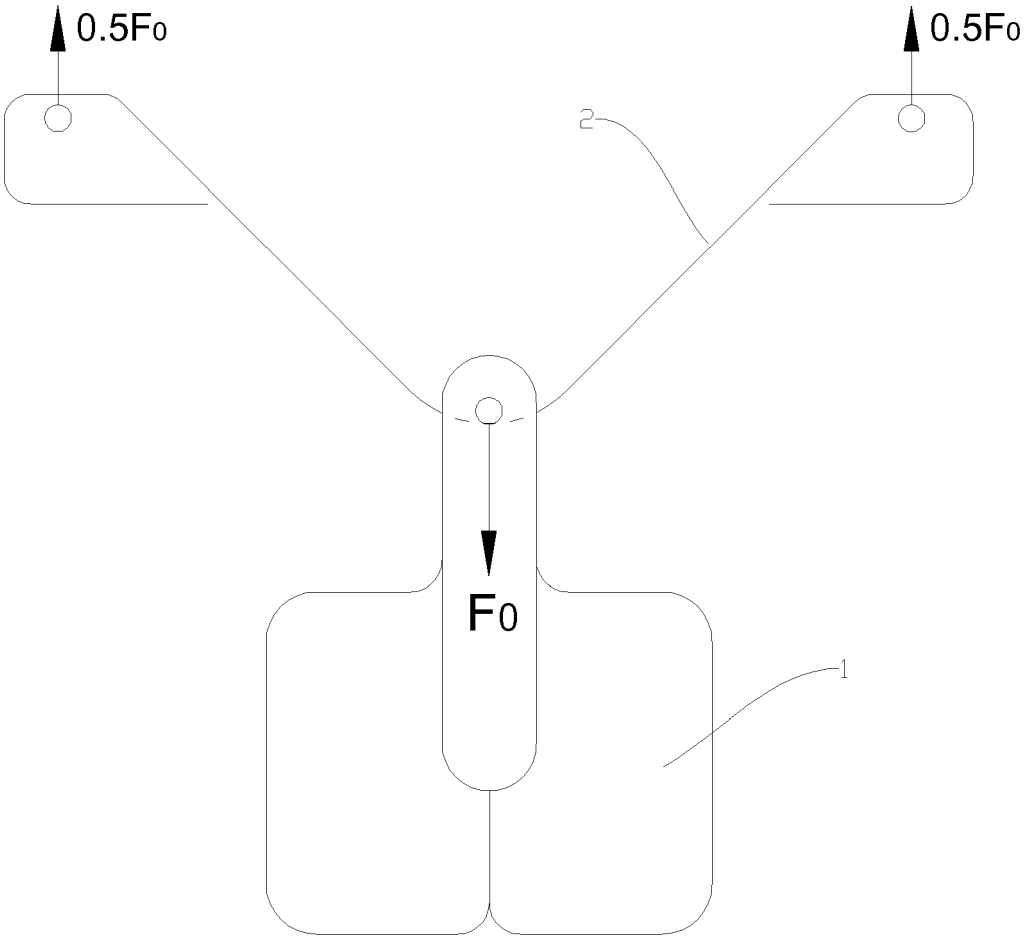


FIG. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 12 17 4120

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 17592 A A.D. 1914 (W.J. HORSFIELD) 21 January 1915 (1915-01-21) * page 1, line 33 - page 2, line 12 * -----	1,2	INV. A41F1/00 A44B13/00
A	US 6 513 209 B1 (C. PORTZLINE) 4 February 2003 (2003-02-04) * column 4, line 13 - column 5, line 3 * -----	1	
A	US 2009/199368 A1 (M. GUT; E. MATHENY) 13 August 2009 (2009-08-13) * paragraphs [0085] - [0090] * -----	1	
A	US 1 408 311 A (C. THOMAS) 28 February 1922 (1922-02-28) * page 1, line 42 - line 89 * -----	1	
A	DE 646 287 C (L. WAGNER) 12 June 1937 (1937-06-12) * page 1, line 42 - page 2, line 58 * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)

A41F
A44B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 September 2012	Goodall, Colin

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

2

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 17 4120

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-09-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 191417592 A	21-01-1915	NONE	
US 6513209 B1	04-02-2003	NONE	
US 2009199368 A1	13-08-2009	US 2009199368 A1 WO 2007108798 A1	13-08-2009 27-09-2007
US 1408311 A	28-02-1922	NONE	
DE 646287 C	12-06-1937	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82