



- (51) International Patent Classification:
B65D 33/25 (2006.01)
- (21) International Application Number:
PCT/US2013/025018
- (22) International Filing Date:
7 February 2013 (07.02.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/596,884 9 February 2012 (09.02.2012) US
13/671,719 8 November 2012 (08.11.2012) US
- (71) Applicant: **ILLINOIS TOOL WORKS INC.** [US/US];
3600 West Lake Avenue, Glenview, Illinois 60026 (US).
- (72) Inventors: **SEPTIEN ROJAS, Jose Manuel**; c/o Illinois
Tool Works Inc., 3600 West Lake Avenue, Glenview,
Illinois 60026 (US). **OFFA-JONES, Martin John**; c/o
Illinois Tool Works Inc., 3600 West Lake Avenue, Glen-
view, Illinois 60026 (US). **AUSNIT, Steven**; c/o Illinois
Tool Works Inc., 3600 West Lake Avenue, Glenview,
Illinois 60026 (US).
- (74) Agent: **HAUPTMAN, Benjamin, J.**; Lowe Hauptman
Ham & Berner, LLP, 2318 Mill Road, Suite 1400, Alexan-
dria, Virginia 22314 (US).

(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, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, 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, 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, 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, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

Published:

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

(54) Title: SPACED MULTI-RIB ZIPPER

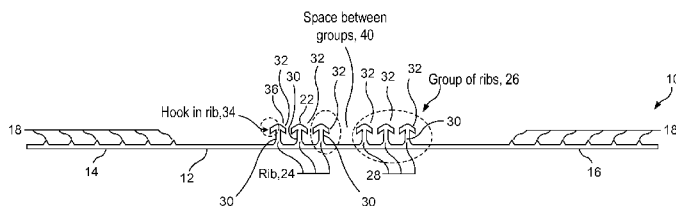


FIG. 1A

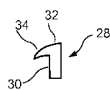


FIG. 1B

(57) Abstract: The present disclosure relates to a one piece multi-rib fastener including at least two groups of ribs, each rib with one or more hooks, wherein the groups are separated by a space less than the width of the maximum number of ribs within one of the groups.



SPACED MULTI-RIB ZIPPER

[0001] This application claims priority under 35 U.S.C. §119(e) of U.S. provisional patent application serial no. 61/596,884 filed on February 9, 2012, the contents of which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE DISCLOSURE

Field of the Disclosure

[0002] The present disclosure relates to zipper for a reclosable package, wherein the zipper includes a multi-rib fastener including at least two groups of ribs, each rib with one or more hooks.

Description of the Prior Art

[0003] In the prior art, multi-alignment zippers are well known. While these zippers are well-developed and suitable for their intended purposes, further improvement are sought with respect to the strength of the interlocked zipper, especially when the profiles are not perfectly aligned and parallel when closed, and with respect to leak-resistance.

OBJECTS AND SUMMARY OF THE DISCLOSURE

[0004] It is therefore an object of the present disclosure to provide improvements in reclosable zippers, particularly with respect to strength, particularly providing a range of alignments, and with respect to leak-resistance.

[0005] This and other objects are attained by providing profiles which are one-piece multi-rib fasteners including at least two groups of ribs, each rib with one or more hooks, wherein the groups of ribs are separated by a space less than the width of the maximum number of ribs within one of the groups and wherein the total number of ribs in each of the groups may be at least two, and perhaps more.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Further objects and advantages of the disclosure will become apparent from the following description and from the accompanying drawings, wherein:

[0007] Figure 1A is a cross-sectional view of a typical multi-rib fastener of the present disclosure.

[0008] Figure 1B is a cross-sectional view of a rib with a single hook..

[0009] Figure 2A is a cross-sectional view of an embodiment of the multi-rib fastener of the present disclosure.

[00010] Figures 2B-2D illustrate various closure configurations of the embodiment of Figure 2A.

[00011] Figure 3A is a cross-sectional view of a further embodiment of the multi-rib fastener of the present disclosure.

[00012] Figure 3B illustrates a closure configuration of the embodiment of Figure 3A.

[00013] Figure 4A is a cross-sectional view of a further embodiment of the multi-rib fastener of the present disclosure.

[00014] Figure 4B illustrates a closure configuration of the embodiment of Figure 3A.

[00015] Figure 5 is a perspective view of a further embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[00016] Referring now to the drawings in detail wherein like numerals indicate like elements throughout the several views, one sees that Figure 1A illustrates a multi-rib fastener 10 with a base 12 forming a first flange 14 and a second flange 16. Multi-rib fastener 10 is typically an integral configuration made from a polymeric material. First and second flanges 14, 16 include upwardly extending anti-seal protrusions 18. Multi-rib fastener 10 of Figure 1A further includes ribs 20 which are arranged in a first group 22 of three ribs 24 and a second group 26 of three ribs 28. In the configuration and orientation of Figure 1A, all ribs 24, 28 are pointing upwardly and are parallel with each other. Ribs 24, 28 are male-type

elements with posts 30 and arrowhead-shaped tip 32. Arrowhead-shaped tip 32 is formed from left hook 34 and right hook 36 (numerals shown on leftmost rib 24 only in Figure 1A). Figure 1B illustrates an embodiment of rib 24' with a single hook 34. First group 22 of ribs 24 is separated by second group 26 of ribs 28 by space or gap 40. Space or gap 40 typically has a width less than the width of either the first or second group 22, 26 of ribs 24, 28.

[00017] While ribs 24, 28 have a male-type configuration, the arrangement of the left and right hooks 34, 36 allow the ribs from opposing identical or substantially identical multi-rib fasteners 10, 10' to inter-engage with each other thereby forming a closure or zipper as shown in Figures 2B-2D. It can be envisioned that female elements are formed between immediately adjacent ribs 24 or 28, for receiving the rib 24 or 28 of the opposing multi-rib fastener 10 or 10'. In other words, immediately adjacent ribs form a space for receiving and inter-engaging ribs from an opposing multi-rib fastener. In Figure 2B, the ribs 24, 28 of multi-rib fasteners 10, 10' are aligned with each other and fully engaged so that two ribs are received within each group of ribs of the opposing fastener. In Figure 2C, the multi-rib fasteners 10, 10' are slightly offset so that only one rib is received within each group of ribs of the opposing fastener. In Figure 2D, only one group of ribs of each multi-rib fastener is inter-engaged.

[00018] Figures 3A and 3B disclose a similar embodiment wherein first group 22 includes three ribs 24 but second group 26 includes two ribs 28. Figure 3A illustrates the multi-rib fasteners 10, 10' separated and Figure 3B illustrates the multi-rib fasteners 10, 10' engaged.

[00019] Figures 4A and 4B disclose a similar embodiment wherein first group 22, second group 26 and third group 29 each include two ribs 24, 28, 31, respectively. It is envisioned that, typically, the multi-rib fasteners 10 or 10' would not include less than a total of five ribs. Likewise, it is envisioned that it is possible that multi-rib fastener 10 may have a different groups of ribs than on multi-rib fastener 10' (for instance the multi-rib fastener 10 of Figure 3A may be combined with the multi-rib fastener 10' of Figure 4A).

[00020] It is envisioned in all of the embodiments that the gap or space 40 between groups of ribs will facilitate the closing of the profile as compared to a closure with a similar number of ribs but with no spaces between the groups of ribs.

[00021] The force required to close the profile and to open it, as well as the sound made by those actions will be related to the configuration of the groups of ribs and the spaces therebetween, the number of ribs interacting with each other, the size of the ribs, the size and number of hooks on those ribs, the angle of those hooks, the type of polymer used and any intentional mechanical deformation applied to those ribs. Different variation of all these parameters can be used to modify the opening force, closing force and sounds generated.

[00022] Additionally, as shown in Figure 5 it is envisioned that some profiles may include transversal cuts 50. These cuts 50 could be perpendicular to the longitudinal direction of the ribs as shown in Figure 5 or at an angle as shown at C in Figure 5. The space between cuts can vary (as shown at A in Figure 5) as well as the depth of the cuts (as shown at B in Figure 5). Different groups of ribs could have different cuts, angle, frequency and penetration. Additionally, as shown by A, B and C of Figure 5, the cuts 50 could be different in various locations or different ribs of the multi-rib fastener 10.

[00023] A typical advantage of a zipper closure formed from multi-rib fasteners as disclosed herein is that with the indicated groups of ribs, spaces between groups and cuts, improved interlocking will be achieved even when the groups are interlocked but are not perfectly aligned and parallel when closing.

[00024] Similarly, another typical advantage of the disclosed embodiments is that improved leak resistance is achieved.

[00025] It is envisioned that the zipper could include two separate multi-rib fastener with equal or different rib constructions and configuration or could be in a single self-mating constructions.

[00026] Thus the several aforementioned objects and advantages are most effectively attained. Although preferred embodiments of the invention have been disclosed and described in detail herein, it should be understood that this invention is in no sense limited thereby and its scope is to be determined by that of the appended claims.

CLAIMS

What is Claimed is:

1. A closure, comprising:
a first fastener and a second fastener;

the first fastener and the second fastener each including at least a first group of ribs and a second group of ribs, wherein the first group of ribs is separated from the second group of ribs by a gap with a width less than a width of the first group or the second group;

the first group of ribs including a plurality of immediately adjacent ribs wherein the space between the immediately adjacent ribs can receive a rib from an opposing fastener and interlock therewith.
2. The closure of Claim 1 wherein the first and second fasteners are formed from polymeric material.
3. The closure of Claim 2 wherein the first and second fasteners each form an integral construction.
4. The closure of Claim 1 further including a first flange extending away from the first group of ribs and a second flange extending away from the second group of ribs.
5. The closure of Claim 1 wherein the ribs of the first and second groups include a post terminating in an arrowhead-shaped tip.
6. The closure of Claim 2 wherein the arrowhead-shaped tip forms a hook on both sides of the rib, wherein the hooks of opposing fasteners inter-engage in a closed position.

7. The closure of Claim 6 wherein the first group of ribs includes three ribs and the second group of ribs includes three ribs.
8. The closure of Claim 6 wherein the first group of ribs includes three ribs and the second group of ribs includes two ribs.
9. The closure of Claim 1 further including a third group of ribs, wherein the third group of ribs is separated from the second group of ribs by a gap with a width less than a width of the first, second or third group, and wherein the first group, the second group and the third group each include two ribs.
10. The closure of claim 1 wherein the ribs include cuts which are transverse to a longitudinal direction of the ribs.
11. The closure of Claim 1 wherein the ribs include cuts which are perpendicular to a longitudinal direction of the ribs.
12. The closure of Claim 1 wherein the ribs include cuts which are at an angle other than ninety degrees to longitudinal direction of the ribs.
13. The closure of Claim 1 wherein the ribs include cuts, wherein a first portion of the cuts have a different depth than the depth of a second portion of the cuts.
14. The closure of Claim 1 wherein the ribs include cuts, wherein spacing of the cuts is non-uniform.

15. The closure of Claim 1 wherein the ribs include cuts, wherein cuts on a first portion of the ribs is different from cuts on a second portion of the ribs.

16. The closure of Claim 1 wherein the groups of ribs on the first fastener is different from the groups of ribs on the second fastener.

17. The closure of Claim 1 wherein the total number of ribs in the first and second groups is at least five.

18. The closure of Claim 1 wherein the ribs each include one and only one hook.

19. The closure of Claim 1 wherein the first fastener and the second fastener can interlock with each other in the absence of alignment with each other.

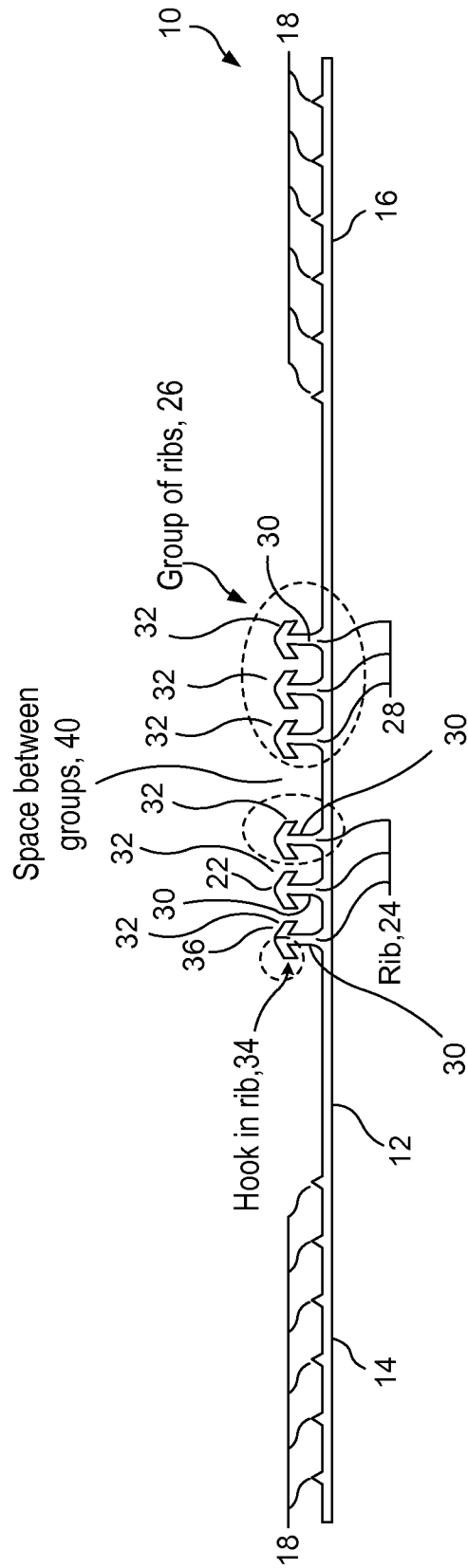


FIG. 1A

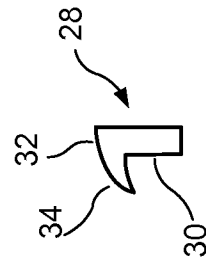
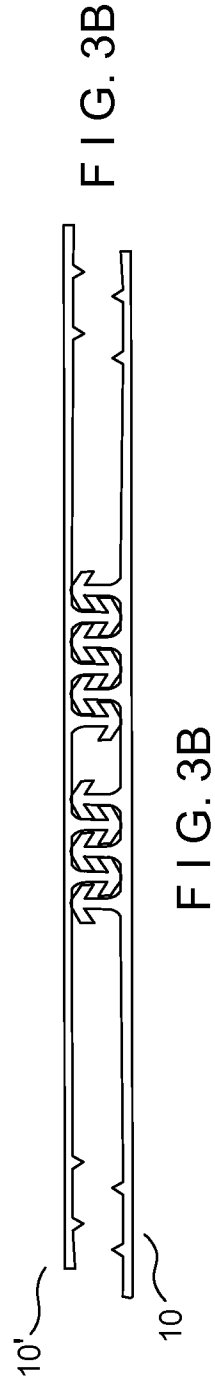
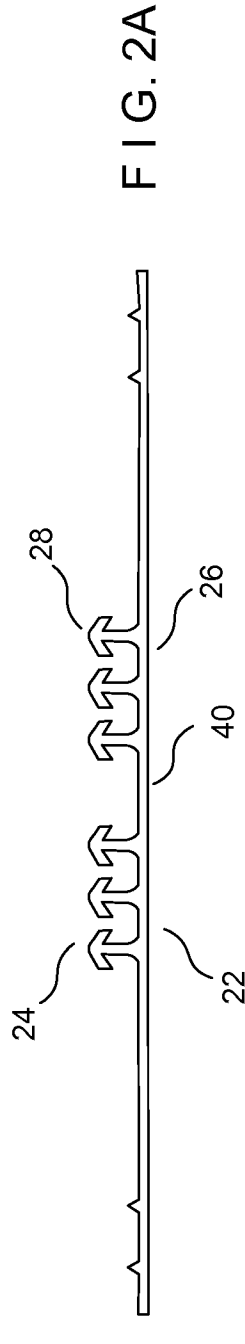
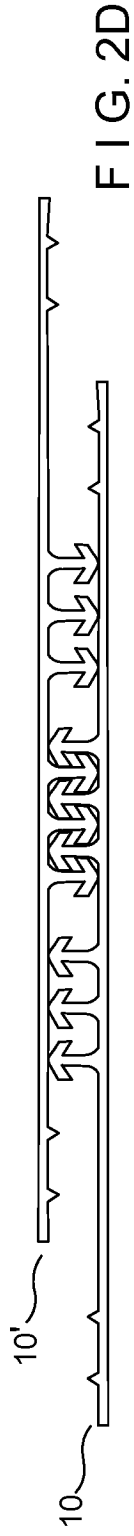
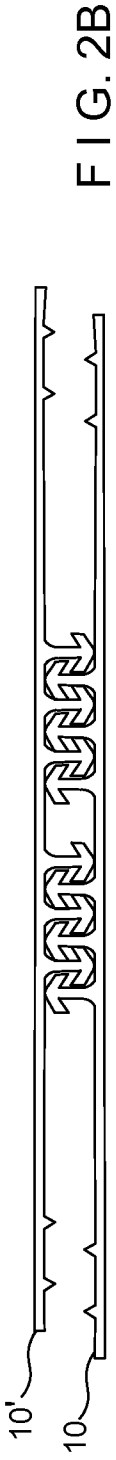


FIG. 1B



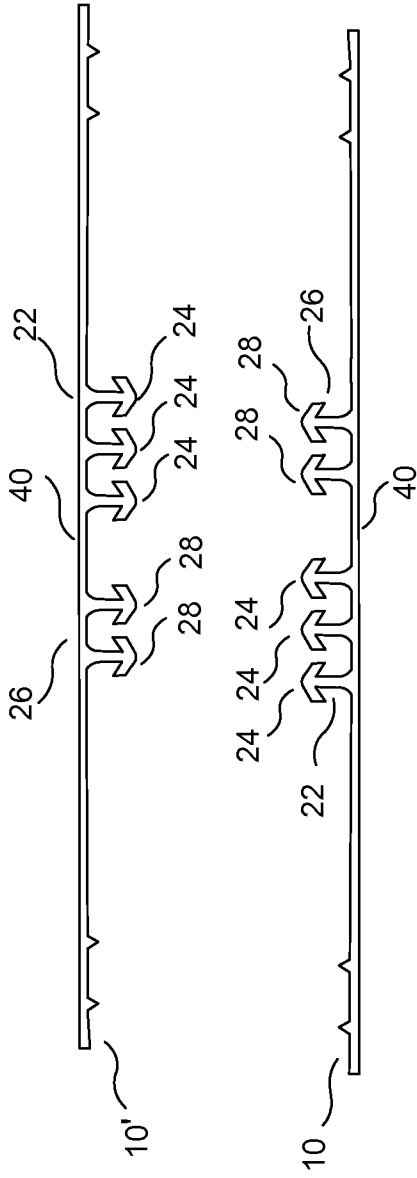


FIG. 3A

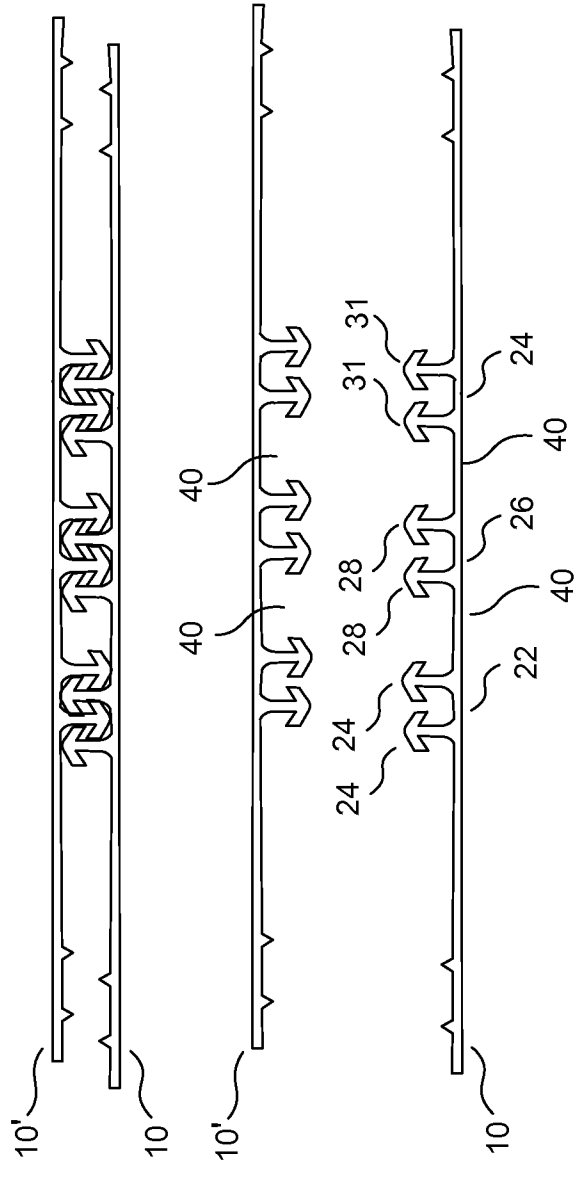


FIG. 4B

FIG. 4A

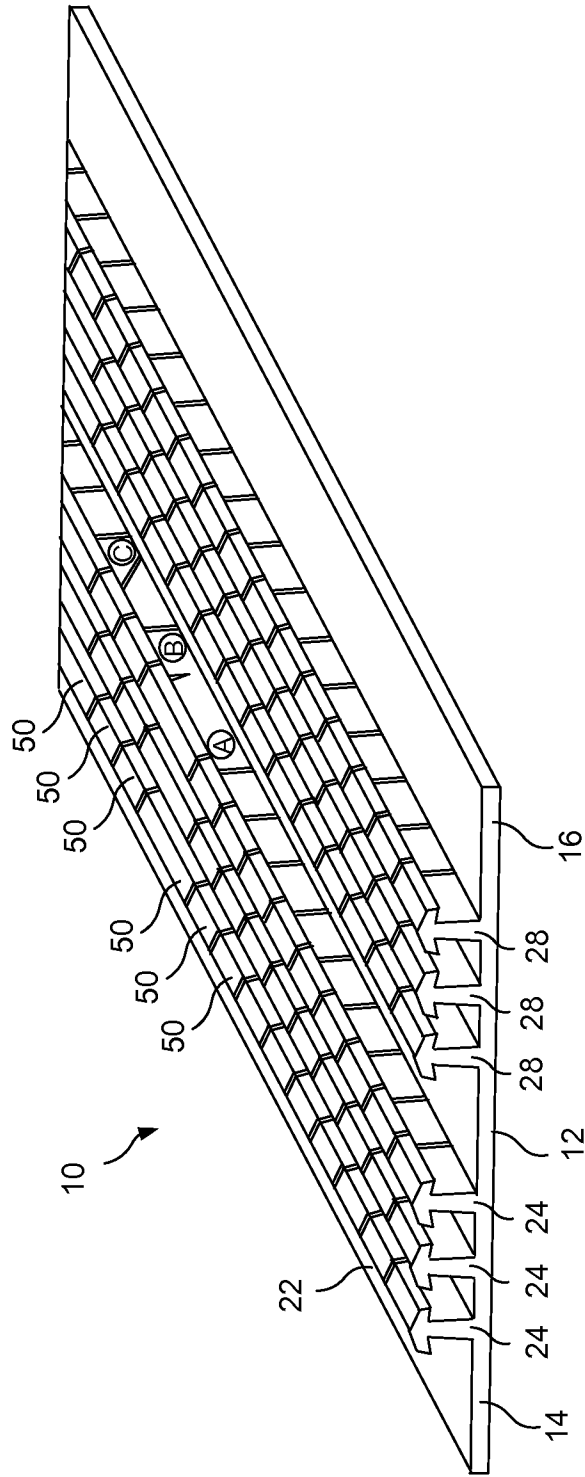


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/025018

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D33/25
ADD.

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)
B65D

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)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/168776 A1 (DAIS BRIAN C [US] ET AL) 3 August 2006 (2006-08-03) paragraph [0028] - paragraph [0034]; figures 3,5,6	1-4, 10-15
X	US 2007/258665 A1 (GRECO CHARLES G [US] ET AL) 8 November 2007 (2007-11-08) the whole document	1-8, 10-19
X	US 2006/159372 A1 (PLOURDE ERIC P [US] ET AL) 20 July 2006 (2006-07-20) the whole document	1-19
X	US 2007/206888 A1 (CHANG CHIA-HSIANG [US]) 6 September 2007 (2007-09-06) the whole document	1-4, 10-15
	----- -/--	

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
9 April 2013	17/04/2013

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Ngo Si Xuyen, G
--	---

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/025018

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/30231 A1 (GOLDING GRIESSEL LESTER HAROLD [AU]) 18 April 2002 (2002-04-18) the whole document	1-4, 10-15
A	----- US 4 792 240 A (AUSNIT STEVEN [US]) 20 December 1988 (1988-12-20) the whole document	1-19
A	----- WO 98/31597 A1 (REYNOLDS CONSUMER PROD [US]) 23 July 1998 (1998-07-23) the whole document	1-19
A	----- US 2003/066267 A1 (NELSON CHARLES [US]) 10 April 2003 (2003-04-10) the whole document	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2013/025018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006168776	A1	03-08-2006	NONE

US 2007258665	A1	08-11-2007	AU 2007248825 A1 15-11-2007
			EP 2021258 A1 11-02-2009
			JP 2009536137 A 08-10-2009
			US 2007258665 A1 08-11-2007
			WO 2007130245 A1 15-11-2007

US 2006159372	A1	20-07-2006	NONE

US 2007206888	A1	06-09-2007	NONE

WO 0230231	A1	18-04-2002	AT 305725 T 15-10-2005
			AU 9151701 A 22-04-2002
			AU 2001291517 B2 11-03-2004
			DE 60113864 T2 20-07-2006
			DK 1324677 T3 19-12-2005
			EP 1324677 A1 09-07-2003
			ES 2249478 T3 01-04-2006
			JP 3641266 B2 20-04-2005
			JP 2004509729 A 02-04-2004
			NZ 525276 A 26-09-2003
			US 2004057775 A1 25-03-2004
			WO 0230231 A1 18-04-2002

US 4792240	A	20-12-1988	NONE

WO 9831597	A1	23-07-1998	CA 2277300 A1 23-07-1998
			DE 69728427 D1 06-05-2004
			DE 69728427 T2 17-03-2005
			EP 0958184 A1 24-11-1999
			JP 2001509119 A 10-07-2001
			US 5878468 A 09-03-1999
			US 5934806 A 10-08-1999
			WO 9831597 A1 23-07-1998

US 2003066267	A1	10-04-2003	NONE
