

US00RE46929E

(19) **United States**  
(12) **Reissued Patent**  
**Gosling et al.**

(10) **Patent Number: US RE46,929 E**  
(45) **Date of Reissued Patent: Jul. 3, 2018**

(54) **INTEGRATED RECONFIGURABLE WALL SYSTEM**

(71) Applicant: **DIRTT Environmental Solutions, LTD, Calgary (CA)**

(72) Inventors: **Geoff Gosling, Calgary (CA); Mogens Smed, DeWinton (CA)**

(73) Assignee: **DIRTT Environmental Solutions, LTD, Calgary (CA)**

(21) Appl. No.: **14/681,874**

(22) Filed: **Apr. 8, 2015**

**Related U.S. Patent Documents**

Reissue of:

(64) Patent No.: **8,024,901**  
Issued: **Sep. 27, 2011**  
Appl. No.: **11/205,314**  
Filed: **Aug. 17, 2005**

U.S. Applications:

(62) Division of application No. 14/032,931, filed on Sep. 20, 2013, which is an application for the reissue of Pat. No. 8,024,901.

(Continued)

(51) **Int. Cl.**  
**E04H 1/00** (2006.01)  
**E04B 1/00** (2006.01)  
**E04B 2/74** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **E04B 2/7424** (2013.01); **E04B 2002/742** (2013.01); **E04B 2002/749** (2013.01);  
(Continued)

(58) **Field of Classification Search**  
CPC ..... **E04B 2/72; E04B 2/74; E04B 2/76; E04B 2/7446; E04B 2/7424**  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

2,042,290 A 5/1936 Barrett  
2,658,810 A 11/1953 Ellis

(Continued)

**FOREIGN PATENT DOCUMENTS**

CA 55086 10/1985  
CA 1294107 11/1987

(Continued)

**OTHER PUBLICATIONS**

International Search Report and Written Opinion for PCT/US2012/041906 dated Jan. 31, 2013.

(Continued)

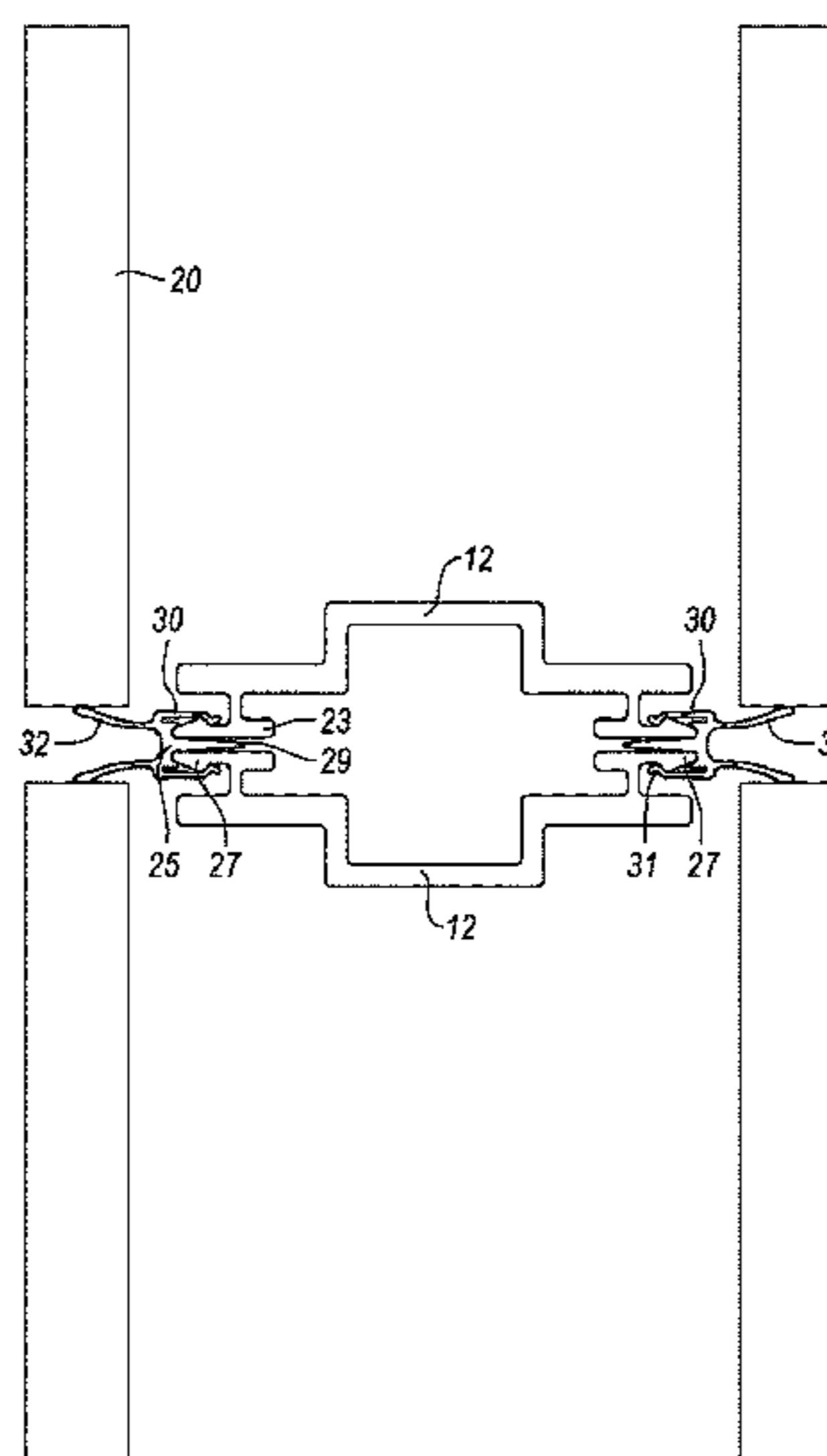
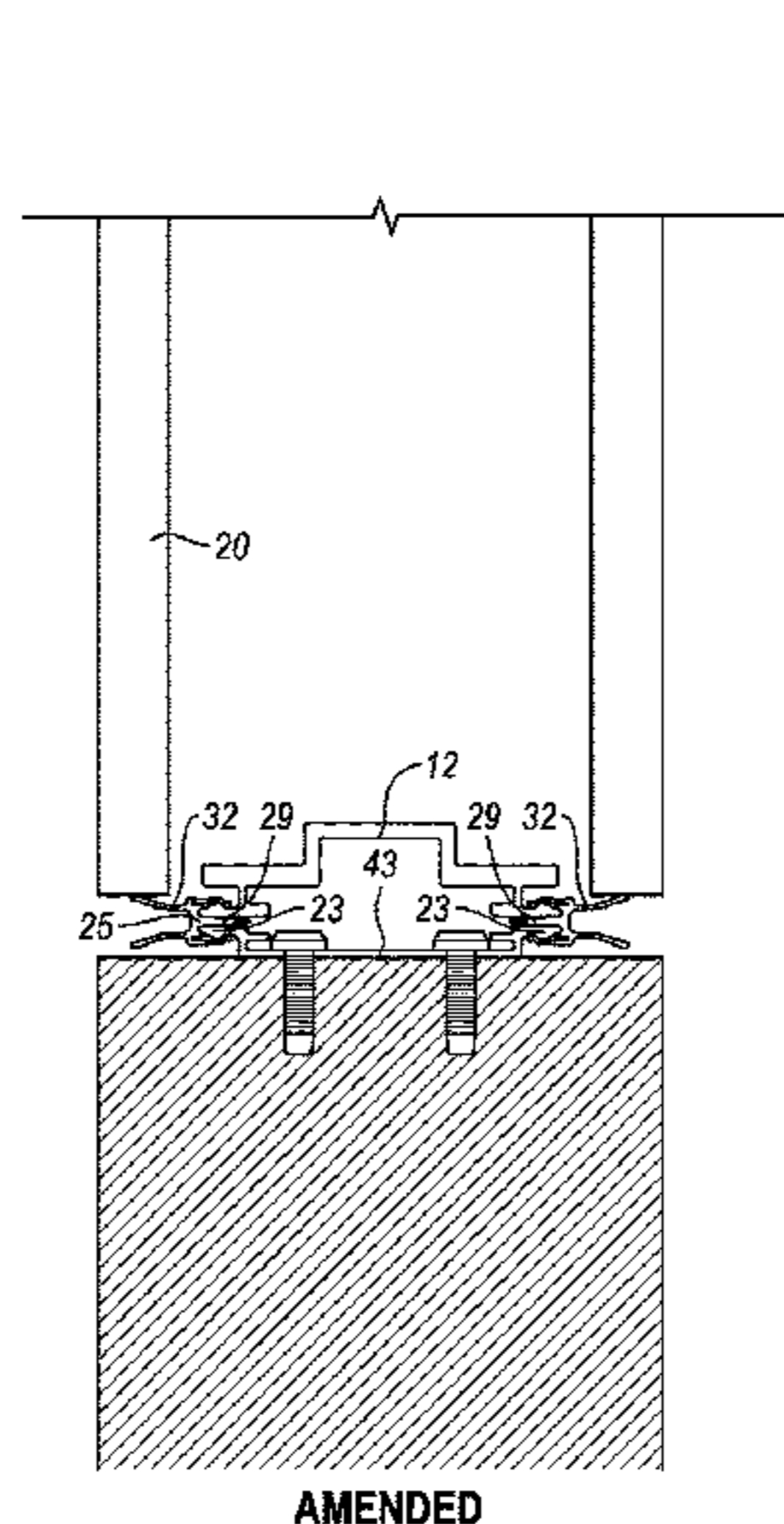
*Primary Examiner* — Jeffrey L Gellner

(74) *Attorney, Agent, or Firm* — Workman Nydegger

(57) **ABSTRACT**

A movable reconfigurable wall system having at least one module having a front and rear surface, the at least one module having: vertical end frames disposed at least at its side edges, each the vertical end frame having a vertically extending flange directed toward the front surface and a vertically extending flange directed toward the rear surface; a plurality of horizontal stringers affixed between the pair of vertical end frames; and an aesthetic surface affixed to the stringers; and a removable connecting strip, the connecting strip adapted to affix about one of the two flanges on one of the vertical end frames and join the one of the two flanges to a corresponding flange on one of a second module, a wall bracket, a finishing trim or a connection post.

**31 Claims, 22 Drawing Sheets**



# US RE46,929 E

- Related U.S. Application Data**
- (60) Provisional application No. 60/601,985, filed on Aug. 17, 2004.
- (52) **U.S. Cl.**  
 CPC ..... E04B 2002/7462 (2013.01); E04B 2002/7483 (2013.01)

(56) **References Cited**  
 U.S. PATENT DOCUMENTS

			5,601,348 A	2/1997	Minkovski	
			5,642,593 A	7/1997	Sheih	
			5,669,314 A	9/1997	Grant	
			5,740,644 A	4/1998	Menchetti	
			5,740,650 A	4/1998	Seiber	
			5,740,744 A	4/1998	Nashirozawa	
			5,746,035 A	5/1998	Seiber	
			5,792,541 A	8/1998	Herrera	
			D397,880 S	9/1998	Saul	
			D398,464 S	9/1998	Cronk	
			5,802,789 A	9/1998	Goodman	
			5,813,178 A	9/1998	Edwards	
			5,822,935 A	10/1998	Mitchell	
			5,826,385 A	10/1998	Dykstra	
			5,836,121 A	11/1998	Hofman	
			5,839,240 A	11/1998	Eisholz	
			5,852,904 A	12/1998	Yu	
			5,870,867 A	2/1999	Mitchell	
			5,875,596 A	3/1999	Muller	
			5,881,979 A	3/1999	Rozier	
			5,913,787 A	6/1999	Edwards	
			5,950,386 A *	9/1999	Shipman et al. ....	52/481.2
			5,978,988 A	11/1999	Burchett	
			6,012,258 A	1/2000	Brown	
			6,047,508 A	4/2000	Goodman	
			6,058,667 A	5/2000	MacDonald	
			6,094,872 A	8/2000	Ward	
			6,112,472 A	9/2000	Van Dyk	
			6,122,871 A	9/2000	Russell	
			6,128,877 A	10/2000	Goodman	
			6,134,845 A	10/2000	Shipman	
			6,141,926 A	11/2000	Rossiter	
			6,158,179 A	12/2000	Ackerly	
			6,161,347 A	12/2000	Yu	
			6,189,270 B1	2/2001	Jeffers	
			6,223,485 B1	5/2001	Beck	
			6,250,020 B1	6/2001	Shipman	
			6,250,032 B1 *	6/2001	Davis et al. ....	52/239
			6,260,321 B1 *	7/2001	Rudduck .....	52/474
			6,282,854 B1 *	9/2001	Vos et al. ....	52/239
			6,295,764 B1	10/2001	Berrdige	
			6,301,846 B1	10/2001	Waalkes	
			6,311,441 B1	11/2001	Beavers	
			6,330,773 B1	12/2001	MacDonald	
			6,341,457 B1 *	1/2002	Aerts et al. ....	52/239
			6,363,663 B1	4/2002	Kane	
			6,393,782 B1	5/2002	Berrdige	
			6,393,783 B2	5/2002	Emaus	
			6,397,533 B1	6/2002	Hornberger	
			6,415,567 B1	7/2002	Mead	
			6,446,396 B1	9/2002	Marangoni	
			6,481,168 B1 *	11/2002	Hodges et al. ....	52/220.7
			6,484,465 B2	11/2002	Higgins	
			6,490,154 B2	12/2002	Thompson	
			6,497,075 B1	12/2002	Schreiner	
			6,530,181 B1	3/2003	Seiber	
			6,557,310 B2	5/2003	Marshall	
			6,571,855 B1	6/2003	Goldsmith	
			6,581,344 B1	6/2003	Niewiadomski	
			6,591,563 B2	7/2003	King	
			6,612,077 B2	9/2003	Parshad	
			6,619,008 B1	9/2003	Shivak	
			6,658,805 B1	12/2003	Yu	
			6,668,514 B2	12/2003	Skov	
			D485,096 S	1/2004	Overthun	
			6,684,929 B2	2/2004	MacDonald	
			6,688,056 B2	2/2004	Von Hoyningen Huene	
			6,701,677 B2	3/2004	Gresham	
			6,711,871 B2	3/2004	Beirise	
			6,729,085 B2	5/2004	Newhouse	
			6,748,710 B2	6/2004	Gresham	
			6,775,953 B2	8/2004	Burken	
			6,799,404 B2	10/2004	Spransy	
			6,807,776 B2	10/2004	Girdwood	
			6,820,388 B2	11/2004	Newhouse	
			6,851,226 B2 *	2/2005	MacGregor .....	A47B 83/001 52/220.7
			6,865,853 B2	3/2005	Burken	
			6,883,277 B2	4/2005	Wiechecki	

(56)

References Cited

U.S. PATENT DOCUMENTS

6,889,477 B1 5/2005 Kottman  
 6,920,727 B2\* 7/2005 Yu et al. .... 52/239  
 6,928,785 B2 8/2005 Shipman  
 6,941,716 B2 9/2005 Kottman  
 6,944,993 B1 9/2005 Jilk  
 6,951,085 B2 10/2005 Hodges  
 6,964,138 B2 11/2005 Carroll  
 6,981,454 B2 1/2006 Burdick  
 6,990,909 B2 1/2006 Gosling  
 6,993,875 B2 2/2006 Rudduck  
 7,051,482 B2 5/2006 MacDonald  
 7,150,127 B2 12/2006 Underwood  
 7,210,270 B1 5/2007 King  
 7,310,918 B1 12/2007 Reuter  
 7,434,790 B1 10/2008 Hansen  
 7,451,577 B2 11/2008 Little  
 7,461,484 B2 12/2008 Battey  
 7,540,115 B2 6/2009 Metcalf  
 7,562,504 B2 7/2009 Herbst  
 7,603,821 B2 10/2009 Eberlein  
 7,644,552 B2 1/2010 Kuipers  
 7,661,237 B2 2/2010 Jakob-Bamberg  
 7,707,790 B2 5/2010 Williams  
 7,818,932 B2 10/2010 Eberlein  
 7,827,745 B2 11/2010 Franceschet  
 7,832,154 B2 11/2010 Gosling  
 7,841,142 B2 11/2010 Towersey  
 7,856,777 B2 12/2010 Lamfers  
 7,861,474 B2 1/2011 Houle  
 7,891,148 B2 2/2011 Underwood  
 7,908,805 B2 3/2011 Metcalf  
 7,913,459 B2 3/2011 Ball  
 7,918,064 B2 4/2011 Singleton  
 7,922,224 B2 4/2011 Arias  
 7,984,598 B2 7/2011 Gosling  
 8,015,766 B2 9/2011 Gosling  
 8,015,767 B2 9/2011 Glick  
 8,024,901 B2 9/2011 Gosling  
 8,033,059 B2 10/2011 Contois  
 8,033,068 B2 10/2011 Luttmann  
 8,046,957 B2 11/2011 Towersey  
 8,151,527 B2 4/2012 Gosling  
 8,151,533 B2 4/2012 Krieger  
 8,176,707 B2 5/2012 Gosling  
 8,215,061 B2 7/2012 Gosling  
 8,272,180 B2 9/2012 Glick  
 8,307,591 B2 11/2012 Steinle  
 8,322,102 B2 12/2012 Krieger  
 8,393,122 B2 3/2013 Henriott  
 8,474,193 B2 7/2013 Sutton  
 8,479,026 B2 7/2013 Lakshmanan  
 8,534,021 B2 9/2013 Liu  
 8,601,749 B2 12/2013 Von Hoyningen Huene  
 8,613,168 B2 12/2013 Von Hoyningen Huene  
 8,615,936 B2 12/2013 Von Hoyningen Huene  
 8,656,648 B2 2/2014 Liegeois  
 8,683,745 B2 4/2014 Artwohl  
 D710,025 S 7/2014 Johnson  
 8,910,435 B2 12/2014 Feldpausch  
 D725,638 S 3/2015 Hofman  
 8,966,839 B2 3/2015 Rebman  
 9,003,731 B2 4/2015 Gosling  
 D731,833 S 6/2015 Fifield  
 9,084,489 B2 7/2015 Gosling  
 9,206,600 B2 12/2015 Von Hoyningen Huene  
 9,284,729 B2 3/2016 Von Hoyningen Huene  
 2001/0039774 A1 11/2001 Beirise  
 2002/0053174 A1 5/2002 Barmark  
 2002/0104271 A1 8/2002 Gallant  
 2002/0108330 A1\* 8/2002 Yu et al. .... 52/238.1  
 2002/0121056 A1 9/2002 Von Hoyningen  
 2002/0124514 A1 9/2002 Higgins  
 2002/0129574 A1 9/2002 Newhouse  
 2002/0144476 A1 10/2002 Mastelli  
 2002/0157335 A1 10/2002 Vos

2003/0005514 A1\* 1/2003 Kunkel ..... E03C 1/0408  
 4/615  
 2003/0060080 A1\* 3/2003 Rees ..... H04N 5/44  
 439/502  
 2003/0089057 A1\* 5/2003 Wiechecki et al. .... 52/238.1  
 2003/0154673 A1 8/2003 Macgregor  
 2003/0196388 A1 10/2003 Edwards  
 2003/0221384 A1 12/2003 Burken et al.  
 2004/0010998 A1 1/2004 Turco  
 2004/0020137 A1\* 2/2004 Battey et al. .... 52/36.1  
 2004/0035074 A1 2/2004 Stanescu et al.  
 2004/0093805 A1 5/2004 Underwood  
 2004/0177573 A1\* 9/2004 Newhouse et al. .... 52/239  
 2005/0005527 A1 1/2005 Metcalf  
 2005/0086871 A1 4/2005 MacGregor  
 2006/0042141 A1 3/2006 Hansen  
 2006/0048457 A1 3/2006 Yang  
 2006/0059806 A1 3/2006 Gosling et al.  
 2006/0185276 A1 8/2006 Pai  
 2007/0277449 A1 12/2007 Burns  
 2007/0289225 A1 12/2007 Kern  
 2008/0069632 A1 3/2008 Gosling  
 2008/0295426 A1 12/2008 Milligan  
 2008/0302054 A1 12/2008 Gosling  
 2009/0021122 A1 1/2009 Green  
 2009/0241437 A1 10/2009 Steinle  
 2009/0260311 A1 10/2009 Boyer  
 2009/0293406 A1 12/2009 Gosling  
 2010/0043142 A1 2/2010 Whitford  
 2010/0192511 A1 8/2010 Gosling  
 2010/0223857 A1 9/2010 Sutton  
 2010/0307086 A1 12/2010 Hibbs  
 2011/0197519 A1 8/2011 Henriott  
 2012/0186164 A1 7/2012 Pensi  
 2012/0317899 A1 12/2012 Von Hoyningen Huene  
 2014/0102021 A1 4/2014 Gosling  
 2014/0310873 A1 10/2014 Gosling  
 2015/0007516 A1 1/2015 Glick  
 2015/0354212 A1 12/2015 Von Hoyningen Huene  
 2016/0032644 A1 2/2016 Geller  
 2016/0053485 A1 2/2016 Von Hoyningen Huene

FOREIGN PATENT DOCUMENTS

CA 2011977 10/1990  
 CA 2002674 5/1991  
 CA 2040822 11/1991  
 CA 2162300 5/1997  
 CA 2273631 10/2001  
 CA 2324050 4/2002  
 CA 2348060 11/2002  
 CA 2359165 4/2003  
 CA 2310869 8/2003  
 CA 2476368 1/2006  
 CA 2428593 8/2007  
 CA 2359547 2/2008  
 CA 2591176 12/2008  
 CA 2634407 12/2008  
 CA 2349964 10/2009  
 CA 2840843 12/2013  
 CA 2535213 4/2014  
 CA 2863783 4/2014  
 CH 686795 6/1996  
 CN 202069245 12/2011  
 DE 1659015 11/1971  
 DE 4207753 9/1993  
 DE 69316247 7/1998  
 DE 19960535 6/2001  
 DE 202004017808 1/2005  
 EP 0302564 2/1989  
 EP 0443202 8/1991  
 EP 0557092 1/1998  
 EP 0963719 12/1999  
 EP 1094167 4/2001  
 FR 1526637 5/1968  
 GB 1259347 1/1972  
 GB 1400613 7/1975  
 GB 2221946 2/1990  
 GB 2283071 4/1995

(56)

References Cited

FOREIGN PATENT DOCUMENTS

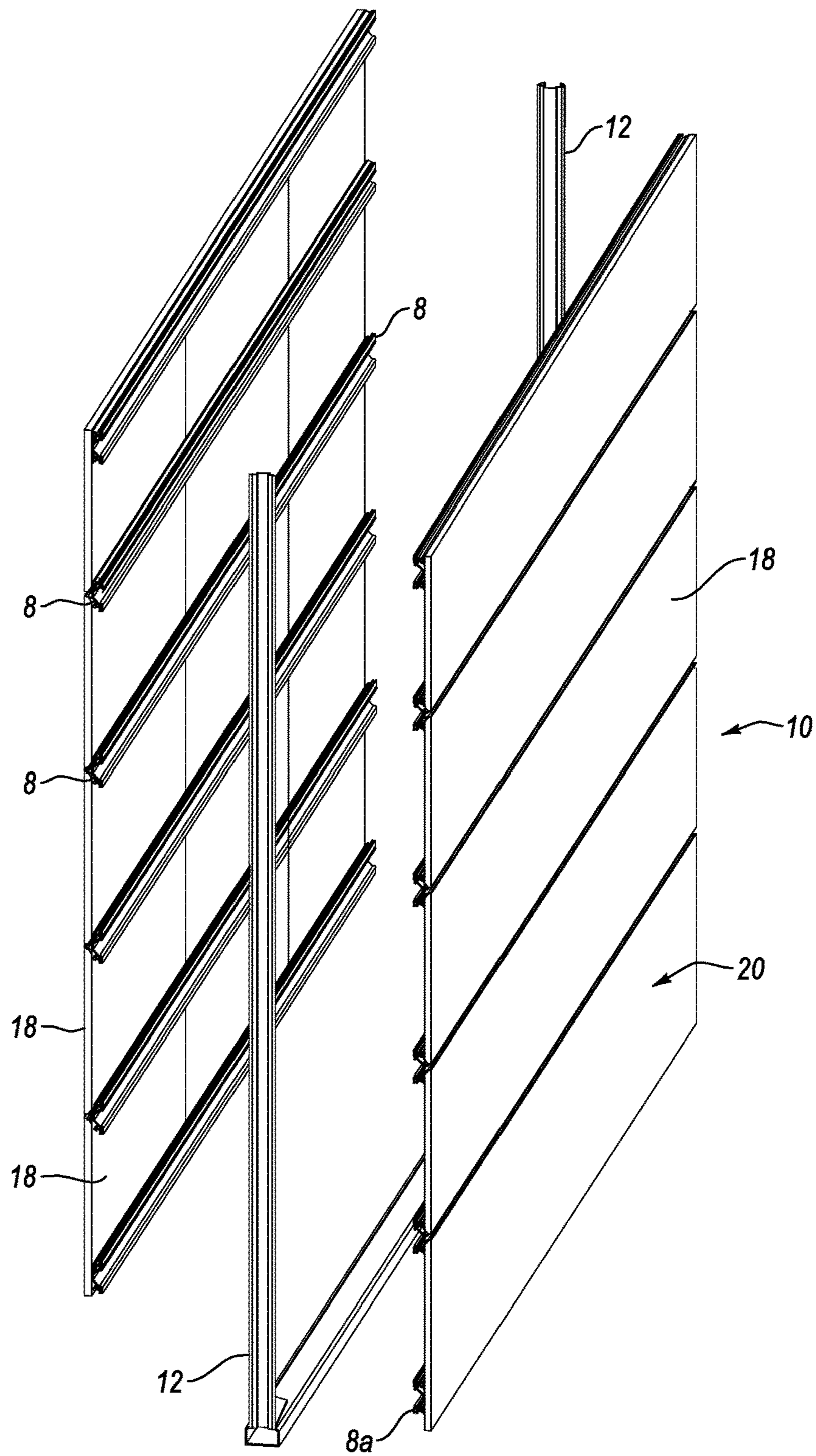
GB	2353541	10/2003
JP	HO3 17333	1/1991
JP	2003105908	4/2003
JP	2005155223	6/2005
KR	20000049102	7/2000
KR	1020070077502	7/2007
WO	WO9212074	7/1992
WO	WO9212300	7/1992
WO	WO9315970	8/1993
WO	WO9323629	11/1993
WO	WO9402695	2/1994
WO	WO9633323	10/1996
WO	WO9746770	12/1997
WO	WO9807357	2/1998
WO	WO9816699	4/1998
WO	WO9829623	7/1998
WO	WO9837292	8/1998
WO	WO9851876	11/1998
WO	WO9946453	9/1999
WO	WO9946455	9/1999
WO	WO9946458	9/1999
WO	WO9953156	10/1999
WO	WO9958780	11/1999
WO	WO9963177	12/1999
WO	WO0015918	3/2000
WO	WO0075447	12/2000
WO	WO0171241	9/2001
WO	WO0208851	1/2002
WO	WO02052111	4/2002
WO	WO02103129	12/2002
WO	WO03071045	8/2003
WO	WO2003071045	8/2003
WO	WO03104581	12/2003
WO	WO2003104581	12/2003
WO	2006127804	11/2006
WO	2010121788	10/2010
WO	WO2012173930	12/2012
WO	WO2013130871	9/2013
WO	WO2013185141	12/2013
WO	WO2013188211	12/2013
WO	WO2013188235	12/2013
WO	2014039278	3/2014
WO	WO2014055883	4/2014

OTHER PUBLICATIONS

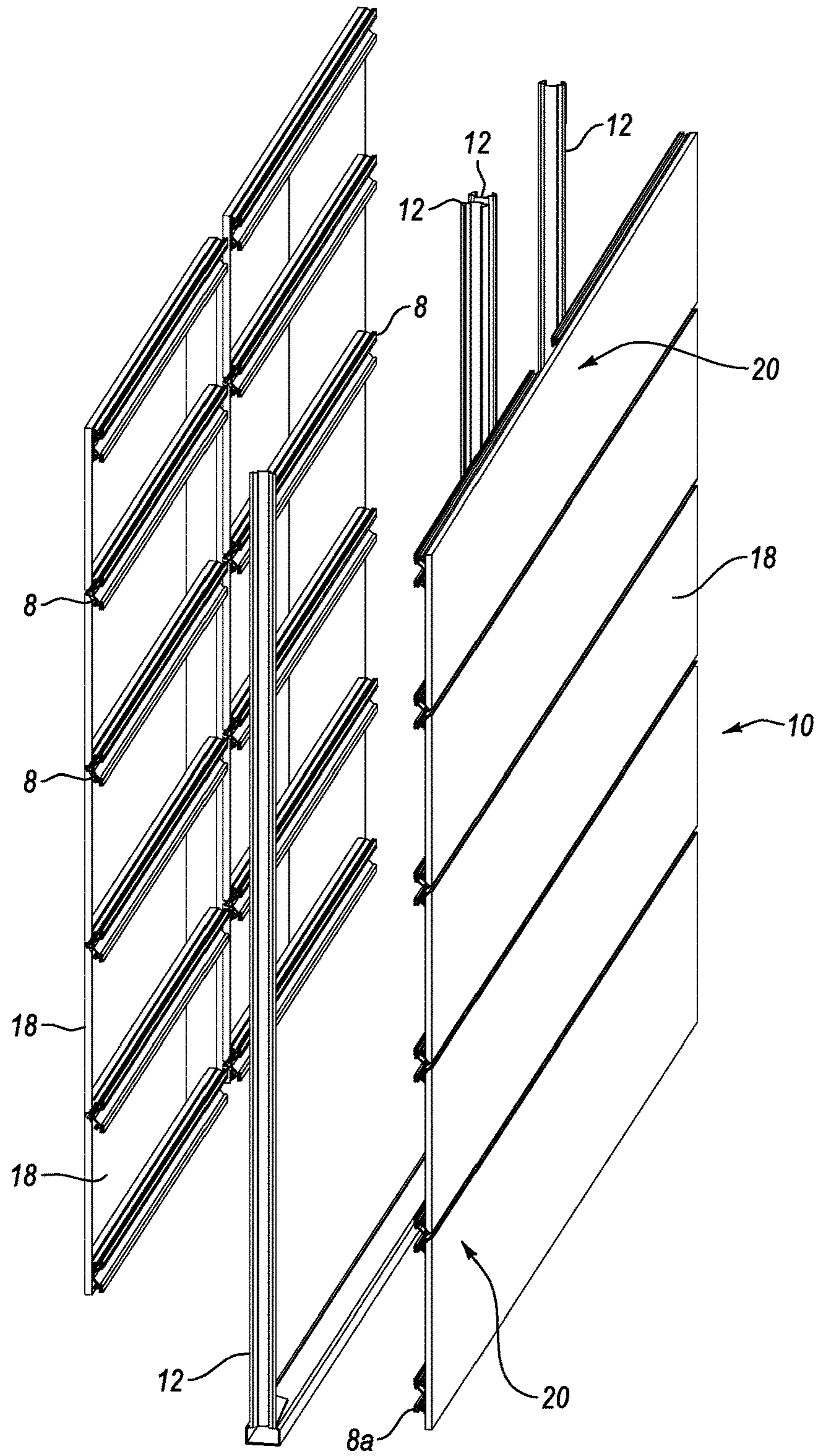
European Search Report, EP 12800672, dated Oct. 16, 2014.  
 International Search Report and Written Opinion for PCT/US2012/042314 dated Jun. 13, 2012.  
 European Search Report for PCT/US2012/042314 dated Jan. 29, 2015.  
 Notice of Allowance for U.S. Appl. No. 29/492,776 dated Jan. 21, 2016.

Notice of Allowance for U.S. Appl. No. 29/493,280 dated Jan. 21, 2016.  
 Decision Denying Institution (IPR2015-01690), *Allsteel v. DIRTT Environmental Solution* dated Jan. 27, 2016.  
 Petition for Inter Partes Review of U.S. Pat. No. 8,024,901, IPR2015-01690, filed Aug 7, 2015.  
 Petition for Inter Partes Review of U.S. Pat. No. 8,024,901, IPR2015-01691, filed Aug 7, 2015.  
 Canadian Office Action for Application No. 2,800,414 dated Jul. 15, 2015.  
 Final Office Action for U.S. Appl. No. 14/657,837 dated Nov. 2, 2015.  
 Patent Owner's Preliminary Response for Case No. IPR2015-01690 dated Nov. 13, 2015.  
 Patent Owner's Preliminary Response for Case No. IPR2015-01691 dated Nov. 18, 2015.  
 Decision Granting Institution (IPR2015-01691), *Allsteel v. DIRTT Environmental Solutions* dated Feb. 2, 2016.  
 Office Action for U.S. Appl. No. 14/032,931 dated Jul. 16, 2015.  
 Genius Architectural Walls, [Publication Date Unlisted], Copyright Date 2004 by KI, Document Code KI-00473/HC/IT/PP/504.  
 KI Improves STC Rating on its Genius Architectural Wall and receives ICC approval, [Publication Date Unlisted], Dated Feb. 26, 2004.  
 Lifespace Environmental Wall Systems, [Publication Date Unlisted], Dated Apr. 1995.  
 Press Release—"KI unveils Genius Full Height Movable Wall Microsite with new interactive features", Accessed on Aug. 14, 2015 at [http://web.archive.org/web/20040506230219/http://www.ki.com/about\\_press\\_release.asp?id=49](http://web.archive.org/web/20040506230219/http://www.ki.com/about_press_release.asp?id=49).  
 Office Insight, [Publication Date Unlisted], Dated Mar. 23, 2009.  
 KI Genius Full-Height Moveable Walls, [Publication Date Unlisted], Copyright Date 2003 by KI, Document Code KI-00506/HC/PP/803.  
 U.S. Specifier Guide and Price Book, [Publication Date Unlisted], Dated Jan. 1998.  
 Achieving the Atkins Aesthetic: KI's new ThinLine option for its award-winning Genius Architectural Wall flaunts a slimmer figure, [Publication Date Unlisted], Dated Jun. 14, 2004.  
 SMED International—Lifespace—Technical Information, [Publication Date Unlisted], Dated Jan. 1, 1996.  
 Teknionaltos—Price and Product Guide Update, [Publication Date Unlisted], Dated Feb. 2002.  
 Office Action for U.S. Appl. No. 14/681,874 dated Jul. 23, 2015.  
 Final Written Decision (IPR2015-01691), *Allsteel v. DIRTT Environmental Solutions* dated Jan. 19, 2017.  
 Notice of Allowance for U.S. Appl. No. 14/657,837 dated Apr. 12, 2016.  
 Non-Final Office Action for U.S. Appl. No. 14/305,819 dated Jul. 11, 2017.  
 Restriction Requirement for U.S. Appl. No. 14/683,684 dated Oct. 5, 2017.

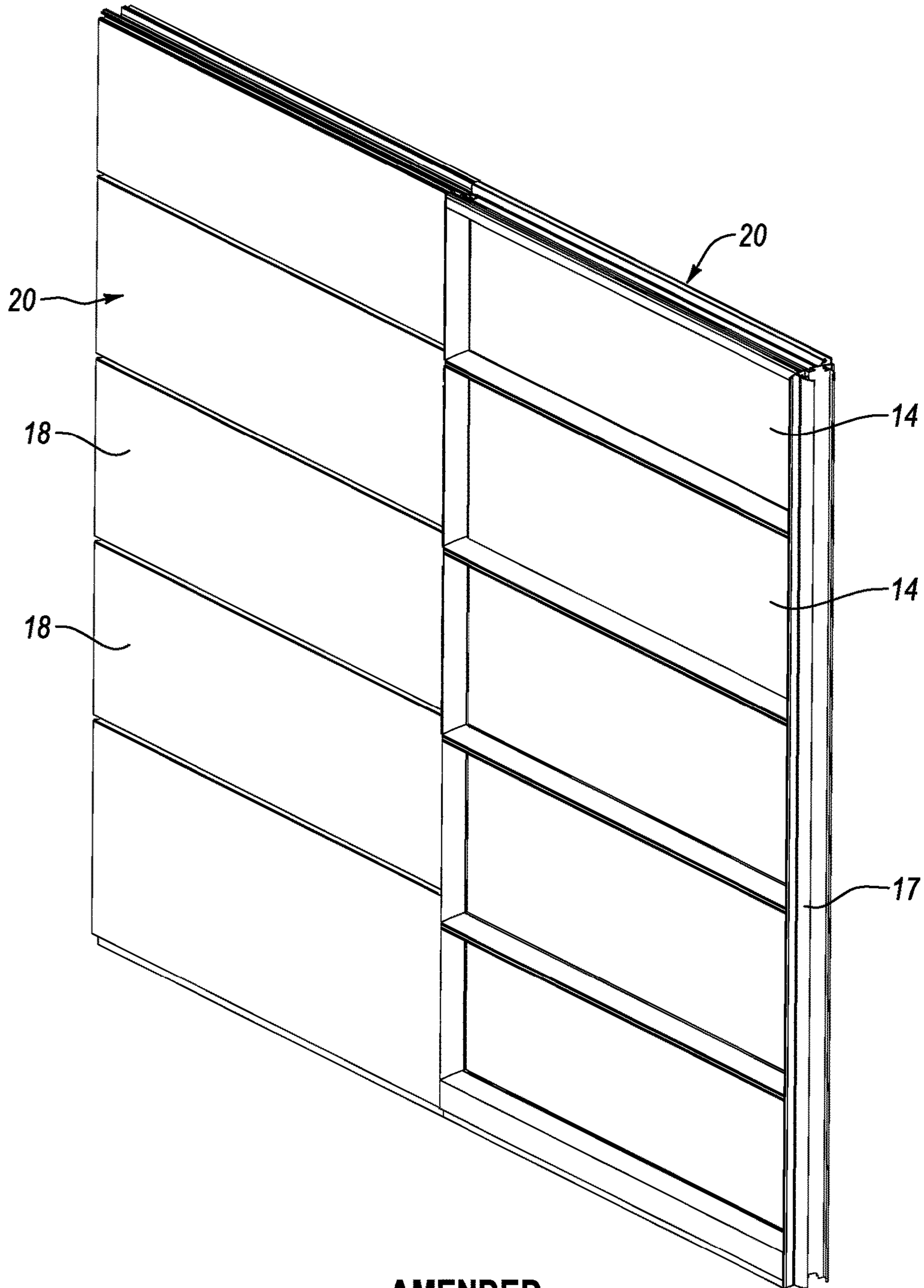
\* cited by examiner



**AMENDED**  
**Figure 1**



NEW  
Figure 1A



**AMENDED**  
**Figure 2**

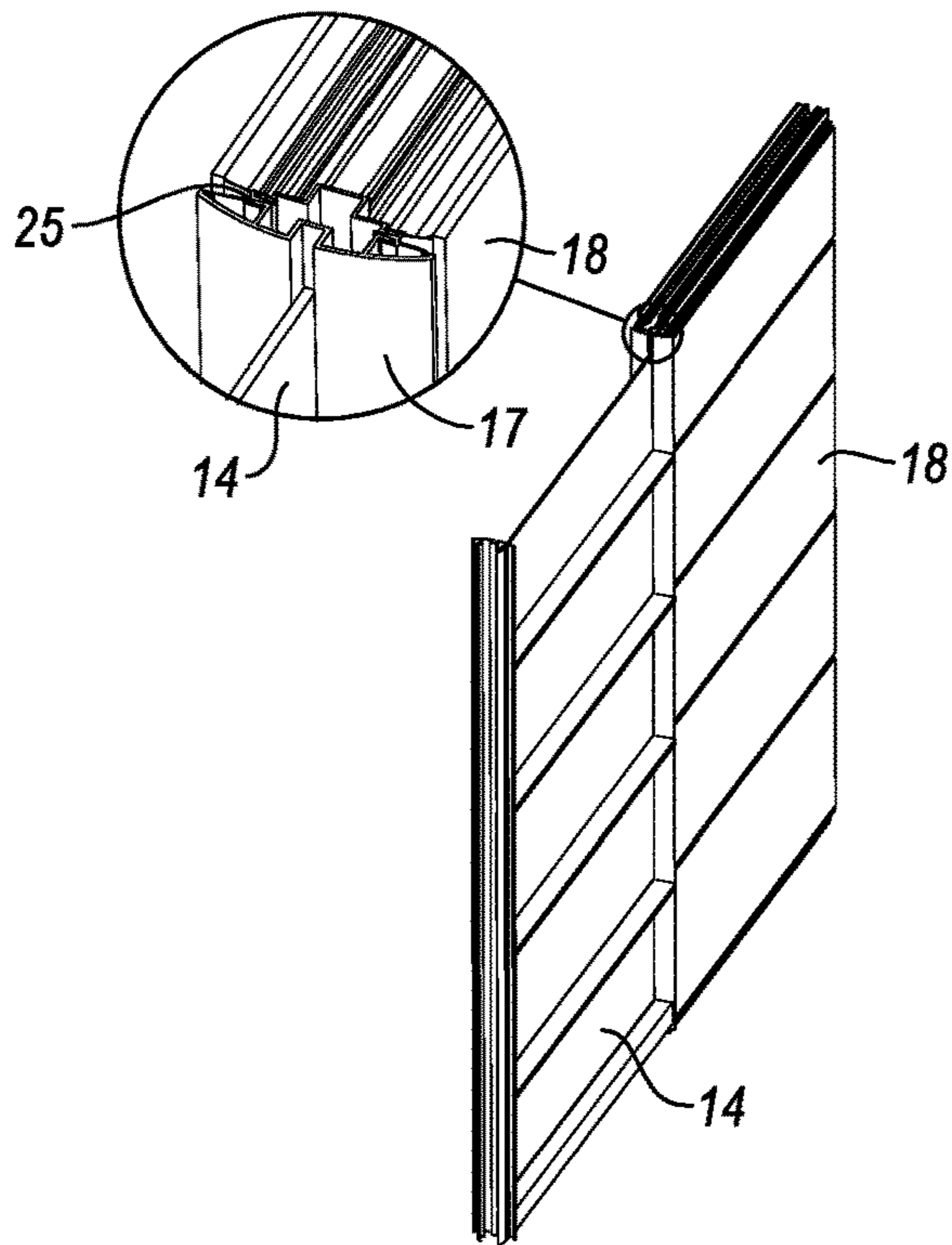
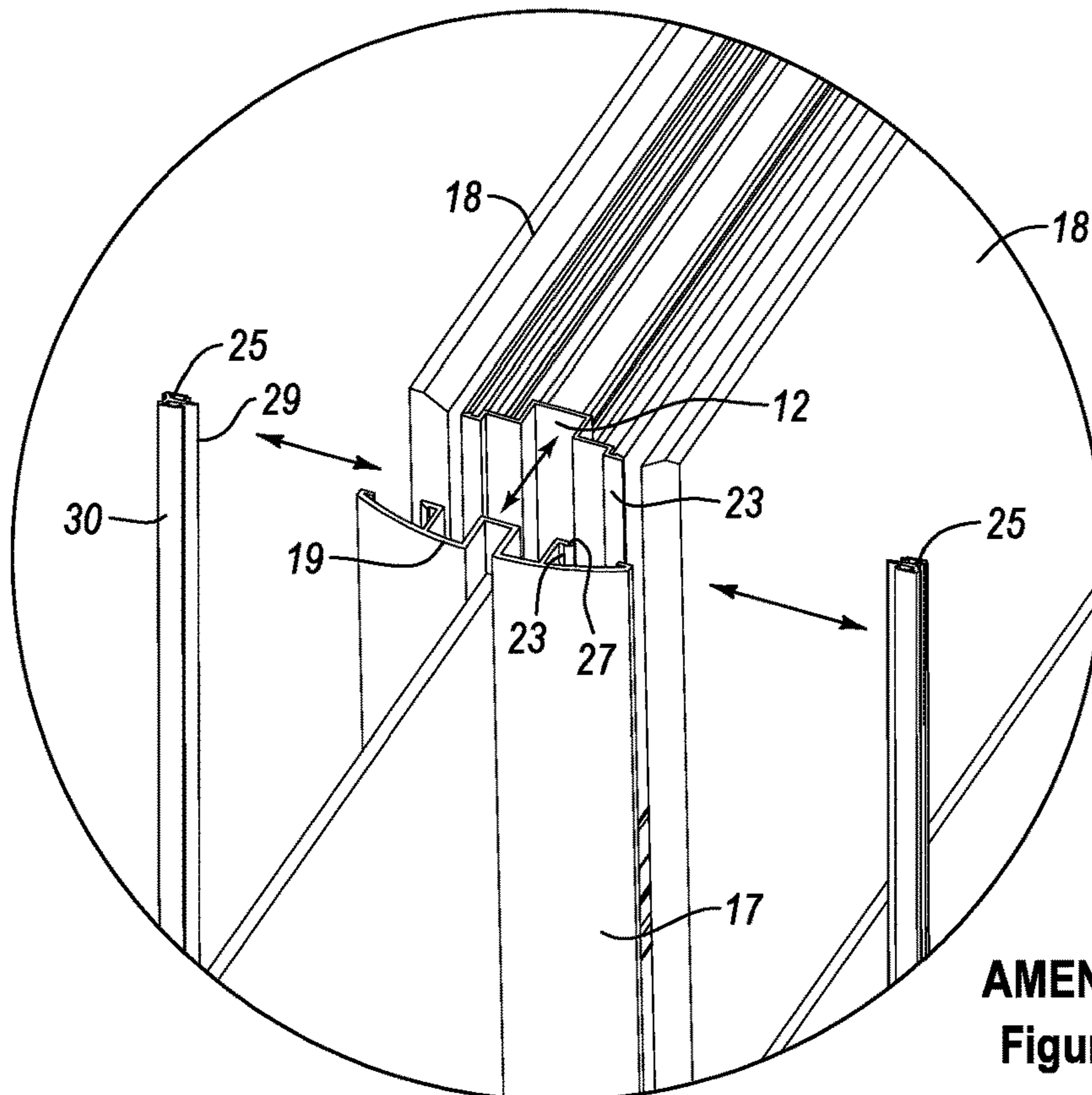


Figure 3



AMENDED  
Figure 4



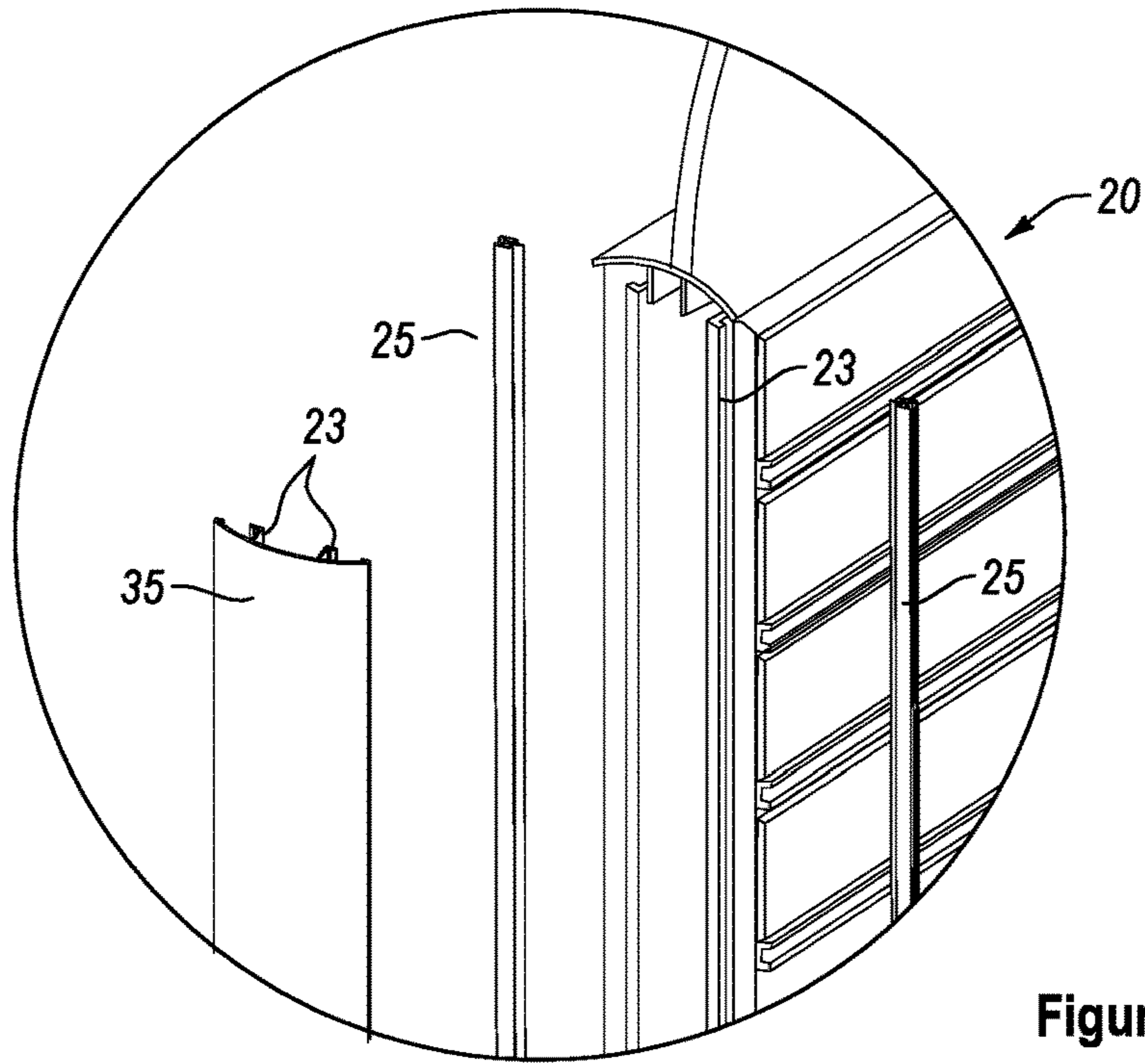
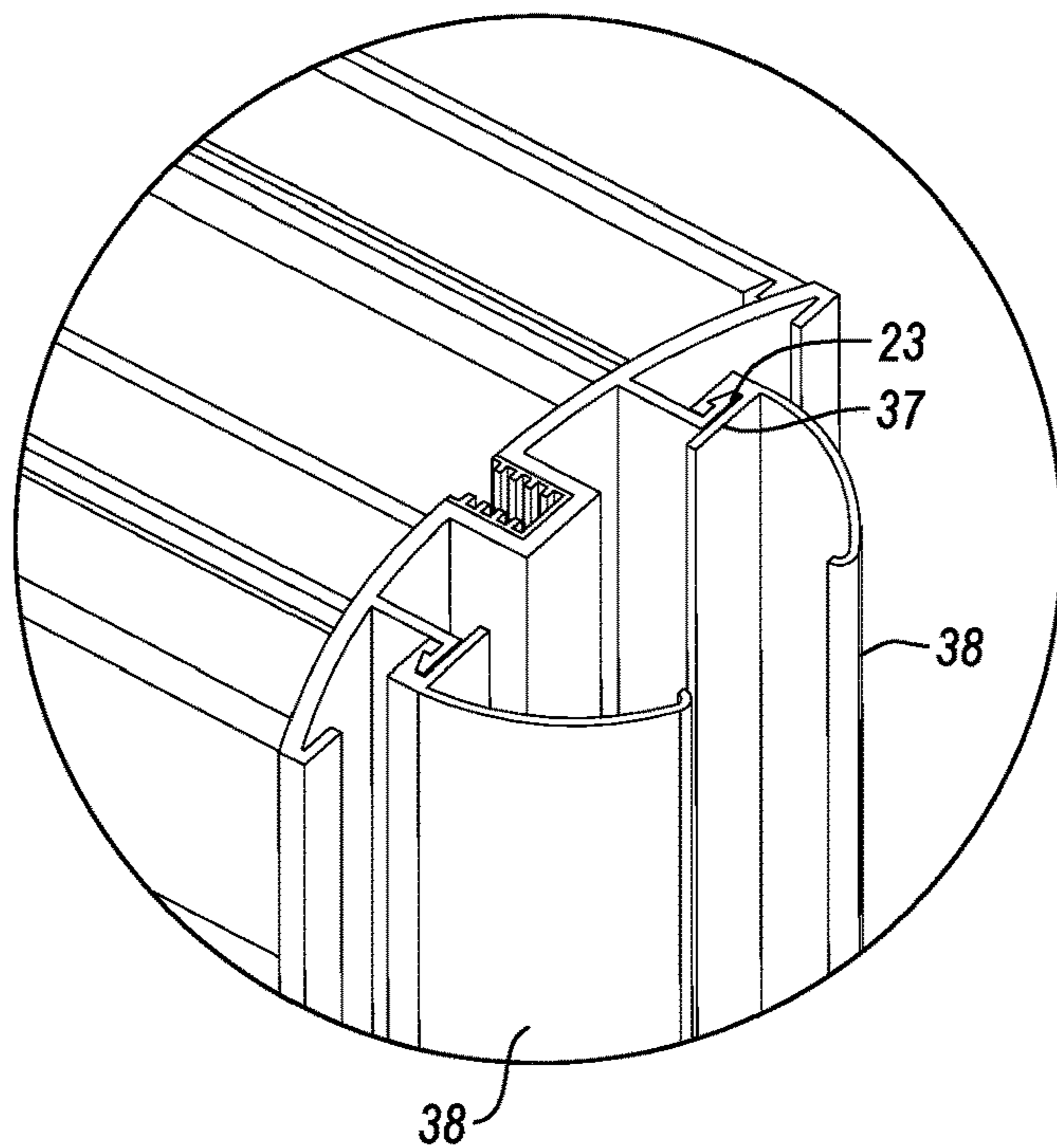


Figure 5



AMENDED  
Figure 6

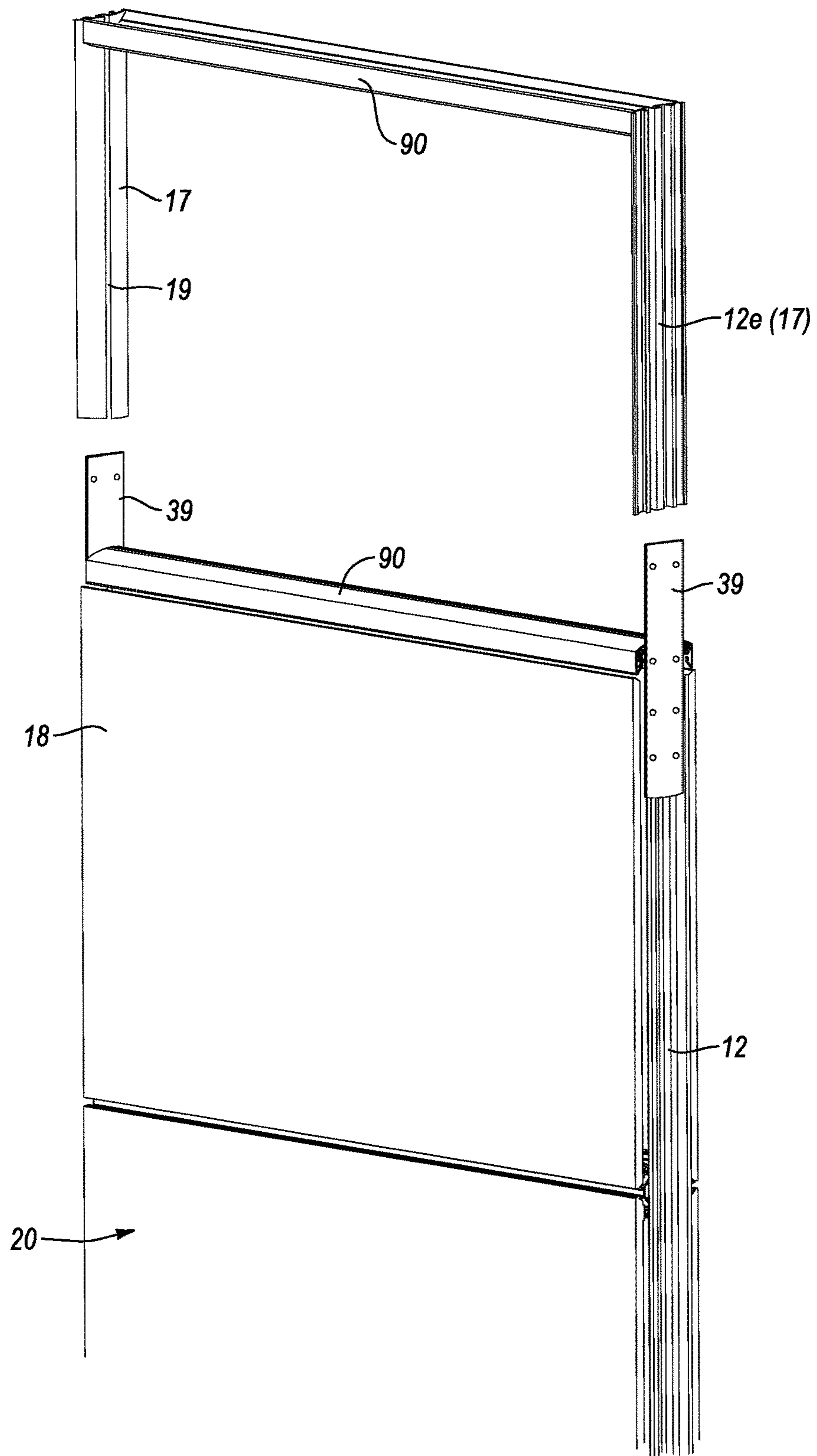
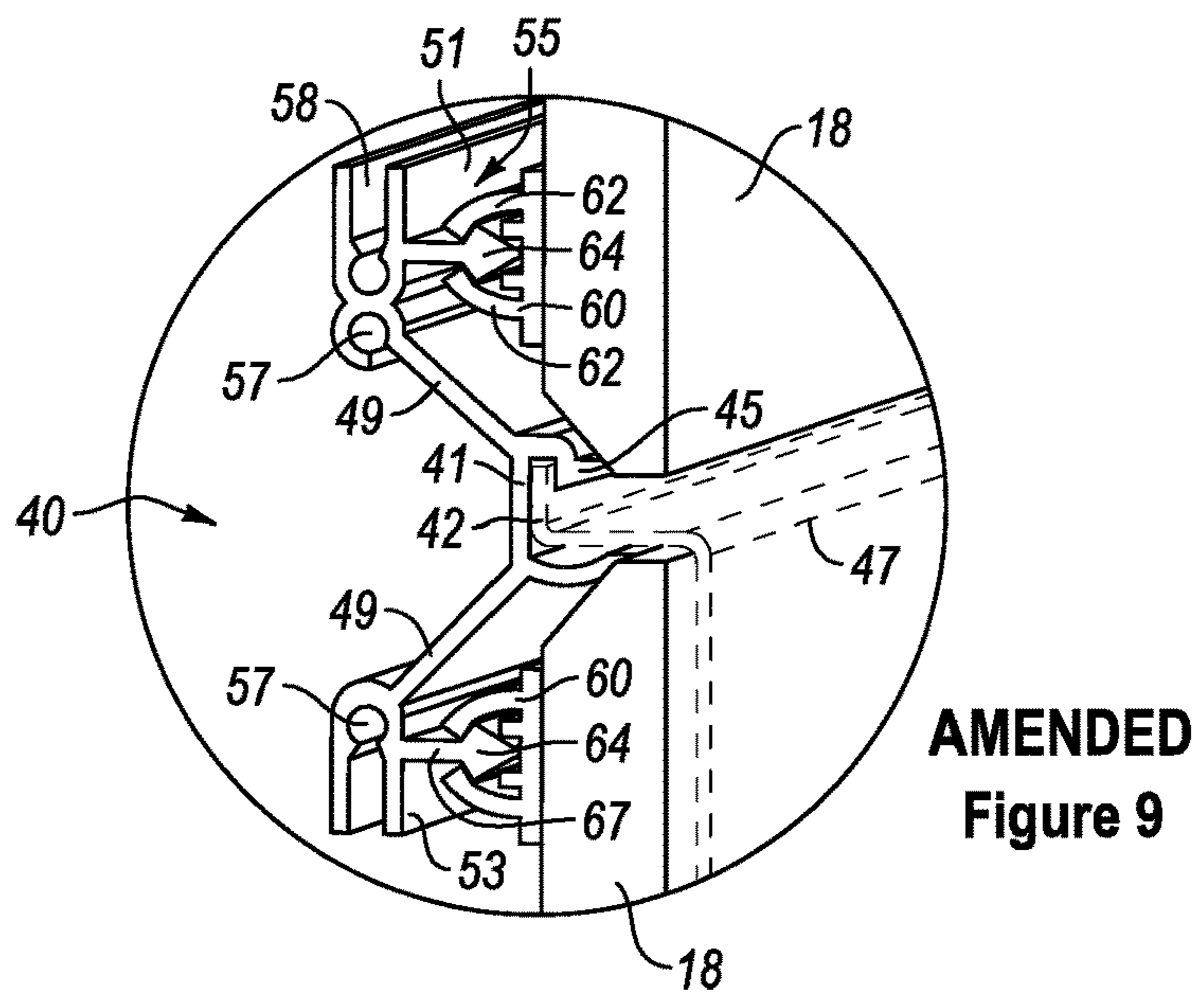
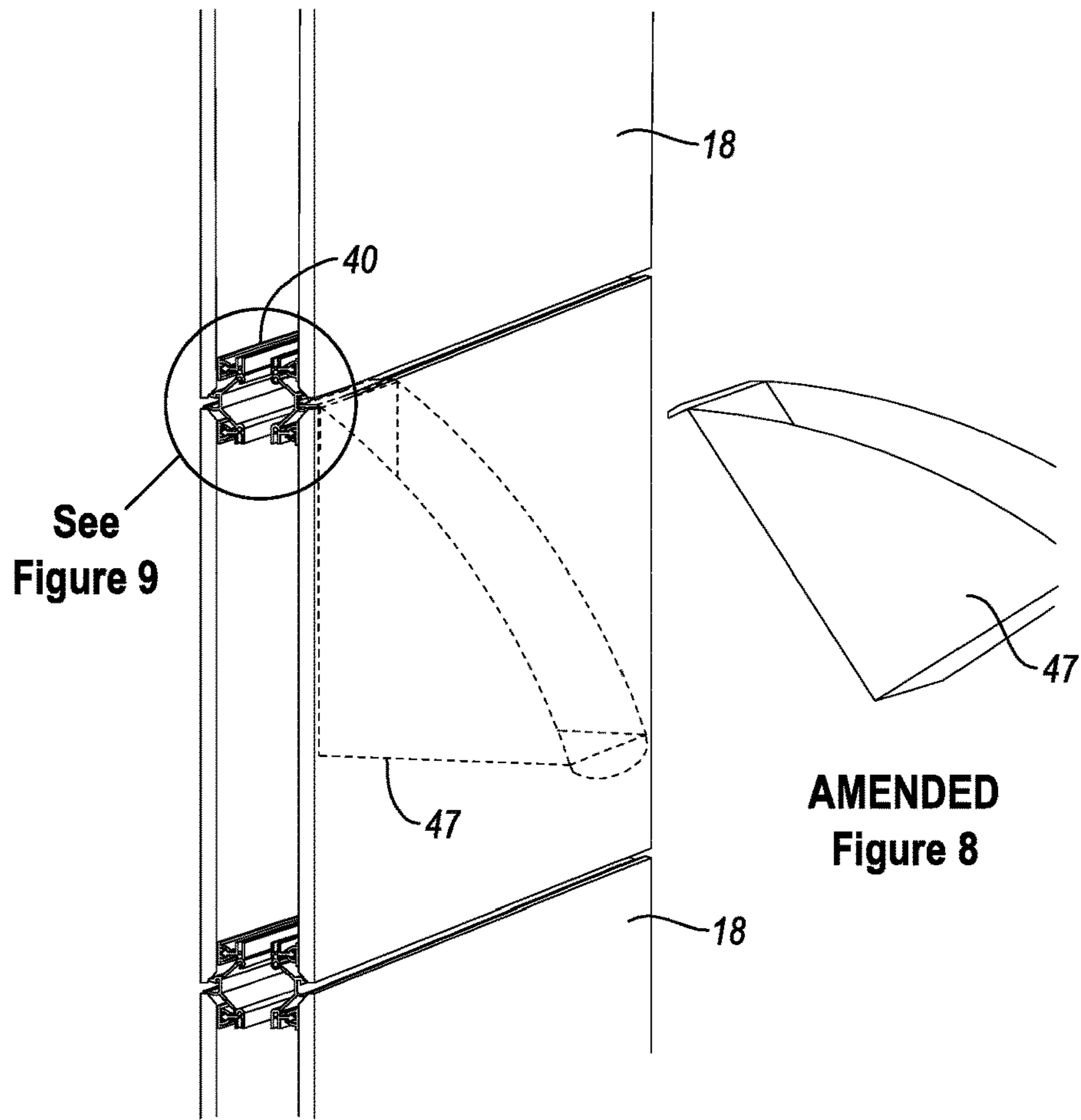


Figure 7



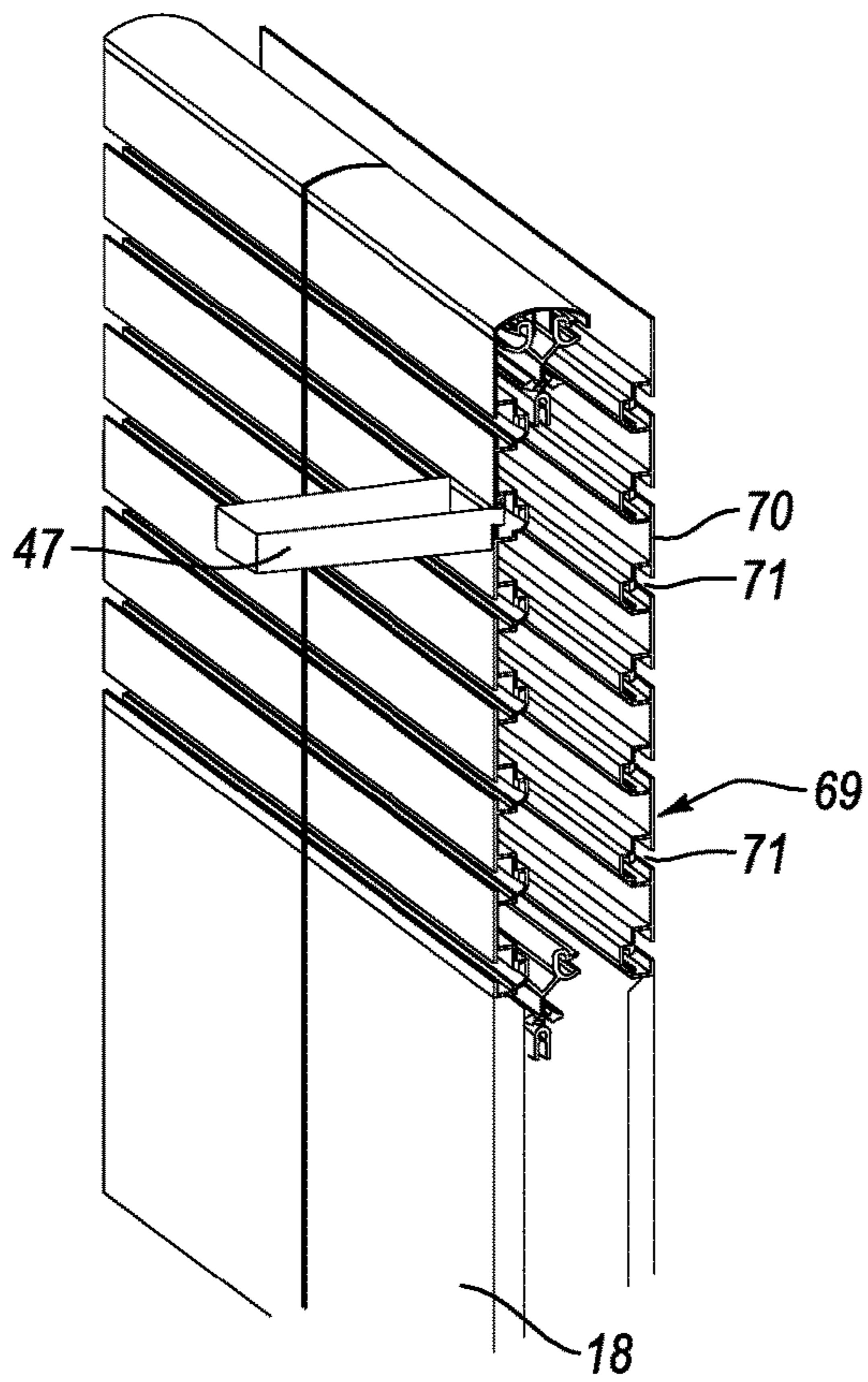


Figure 10

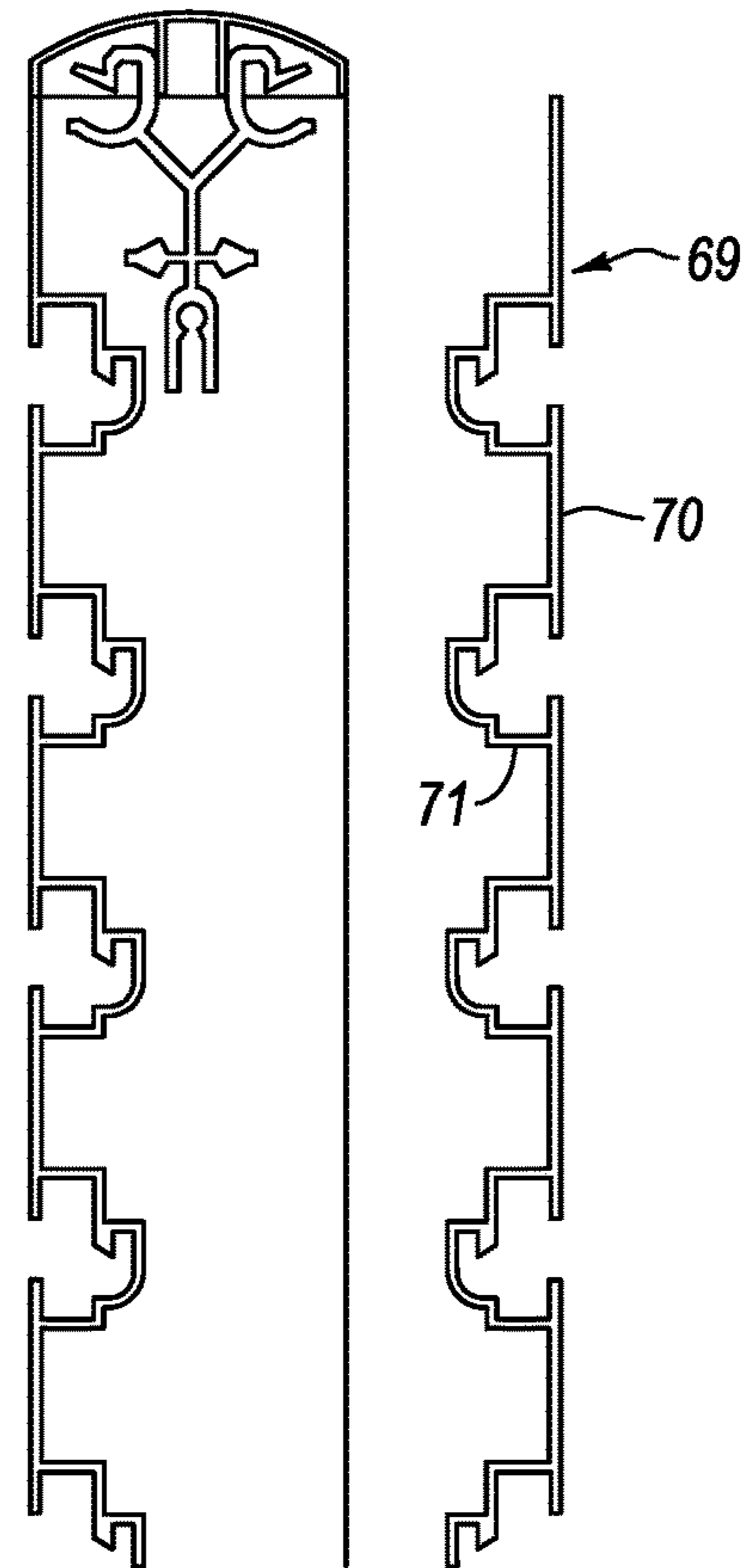


Figure 11

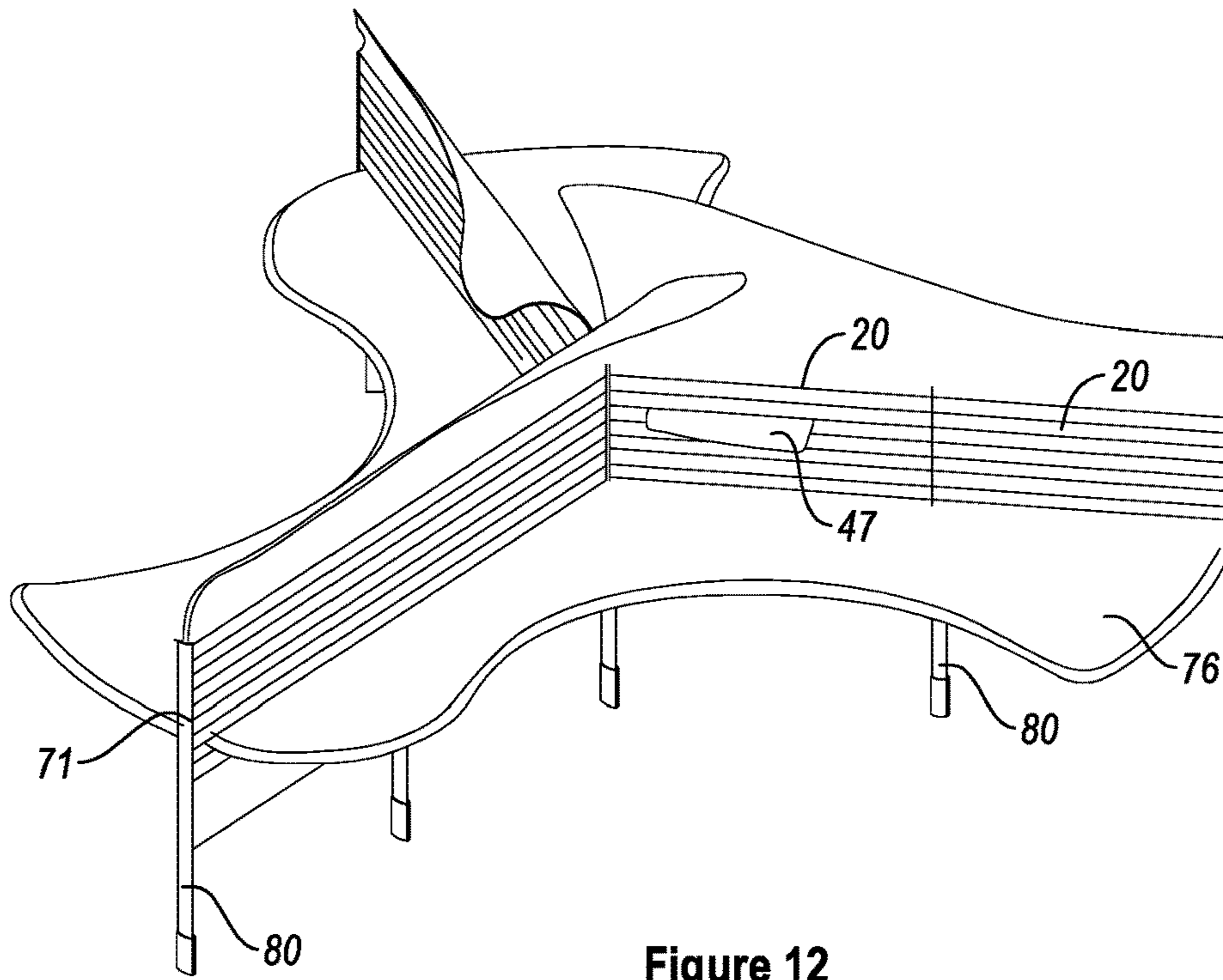
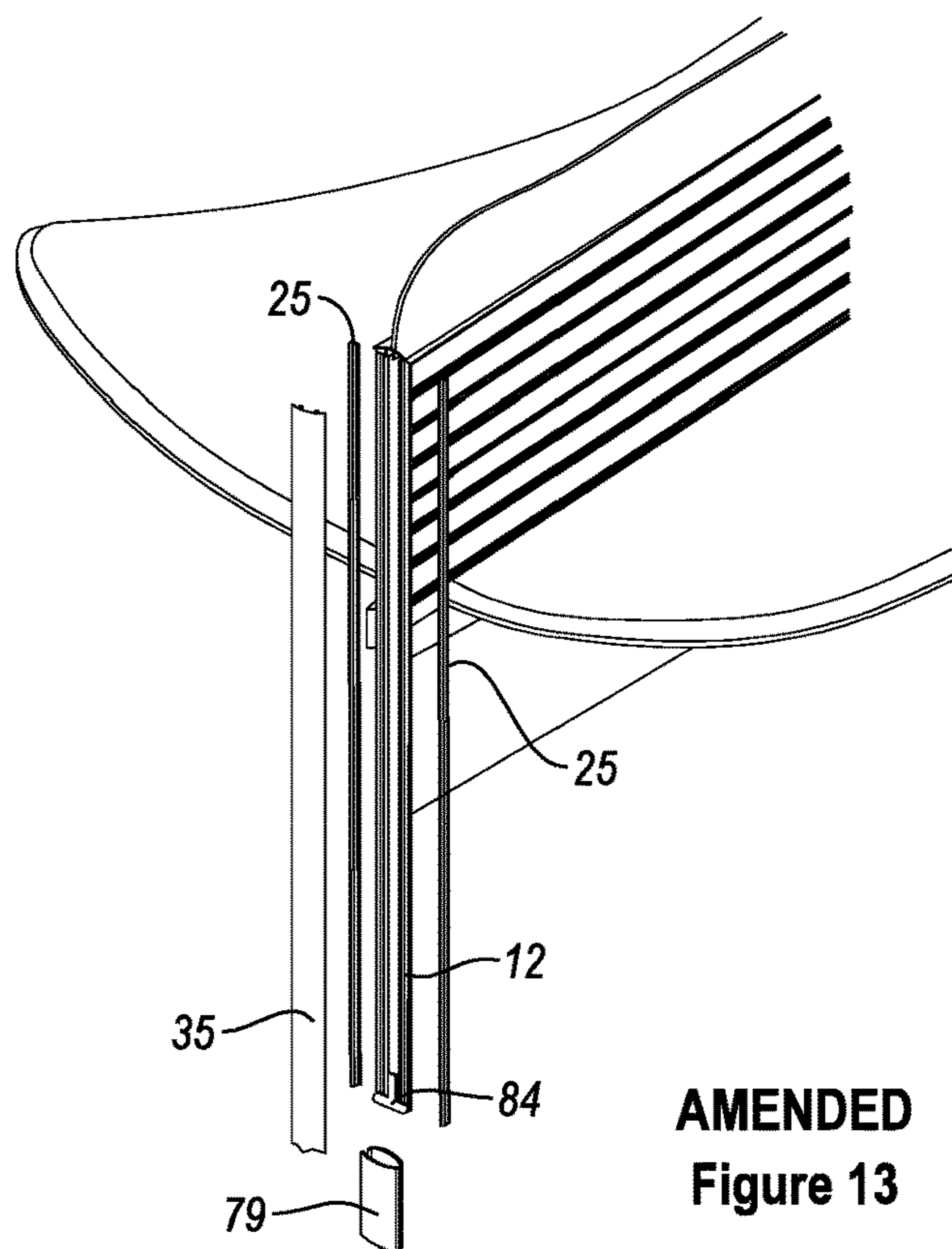


Figure 12



AMENDED  
Figure 13

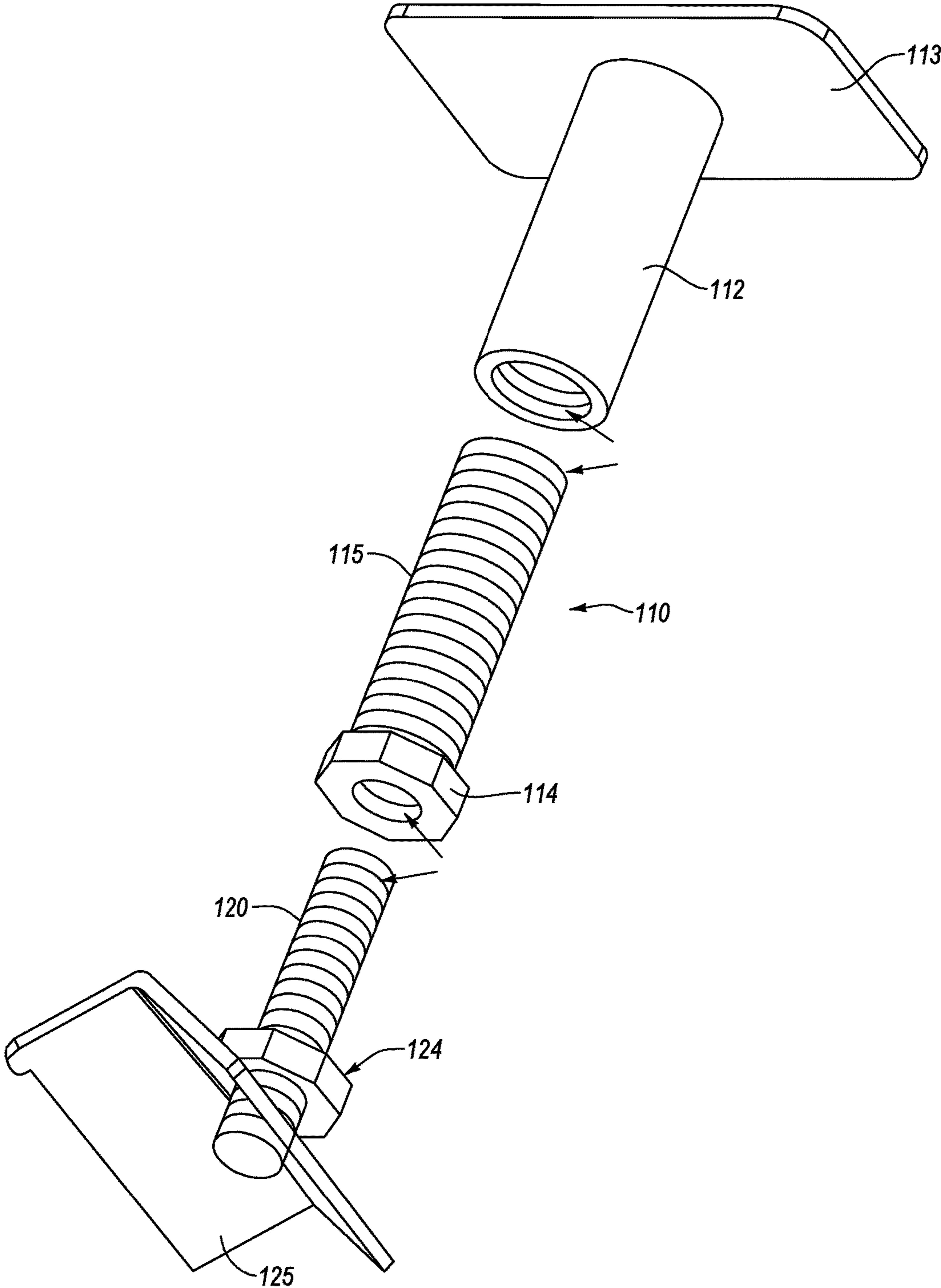
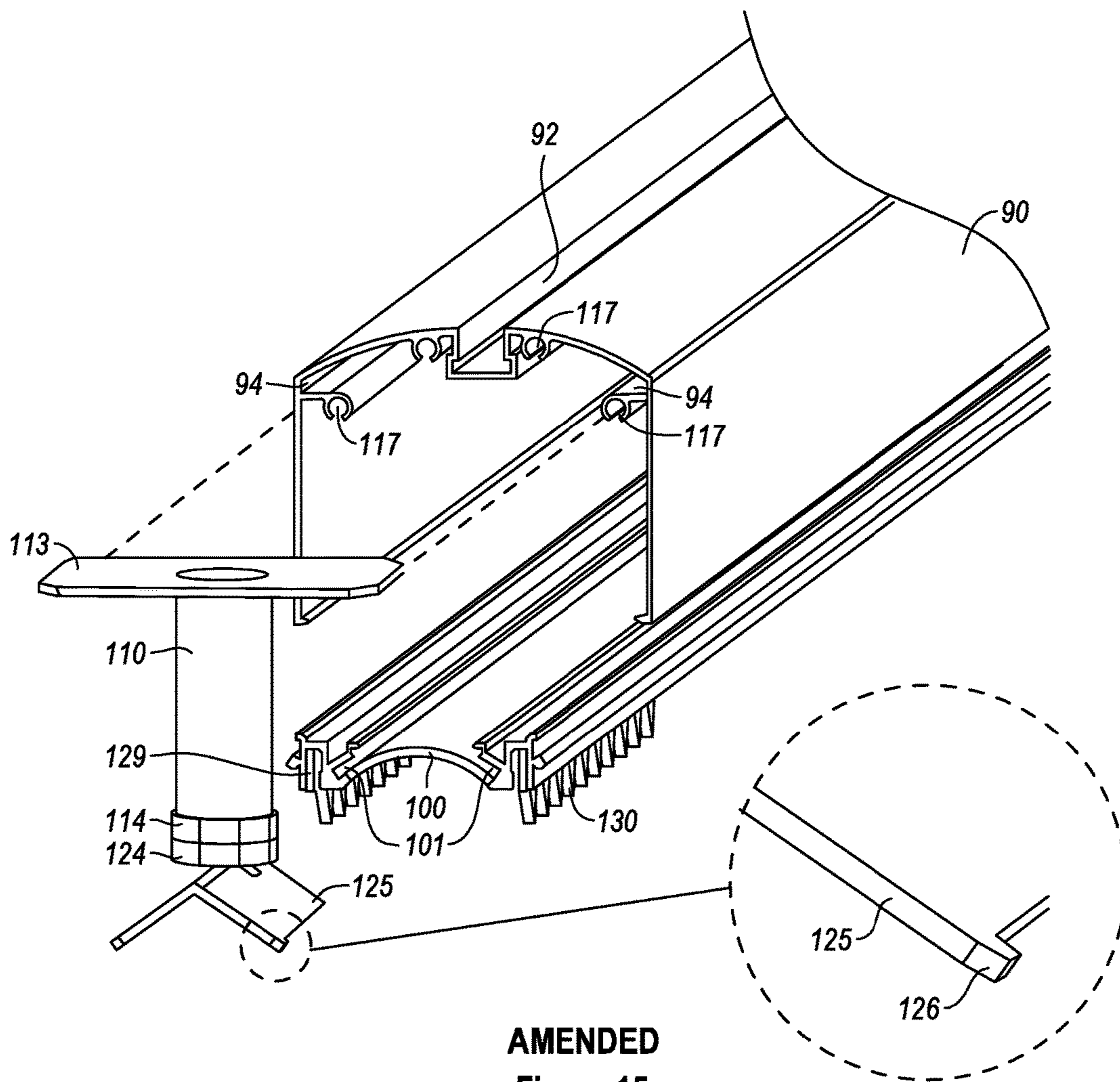
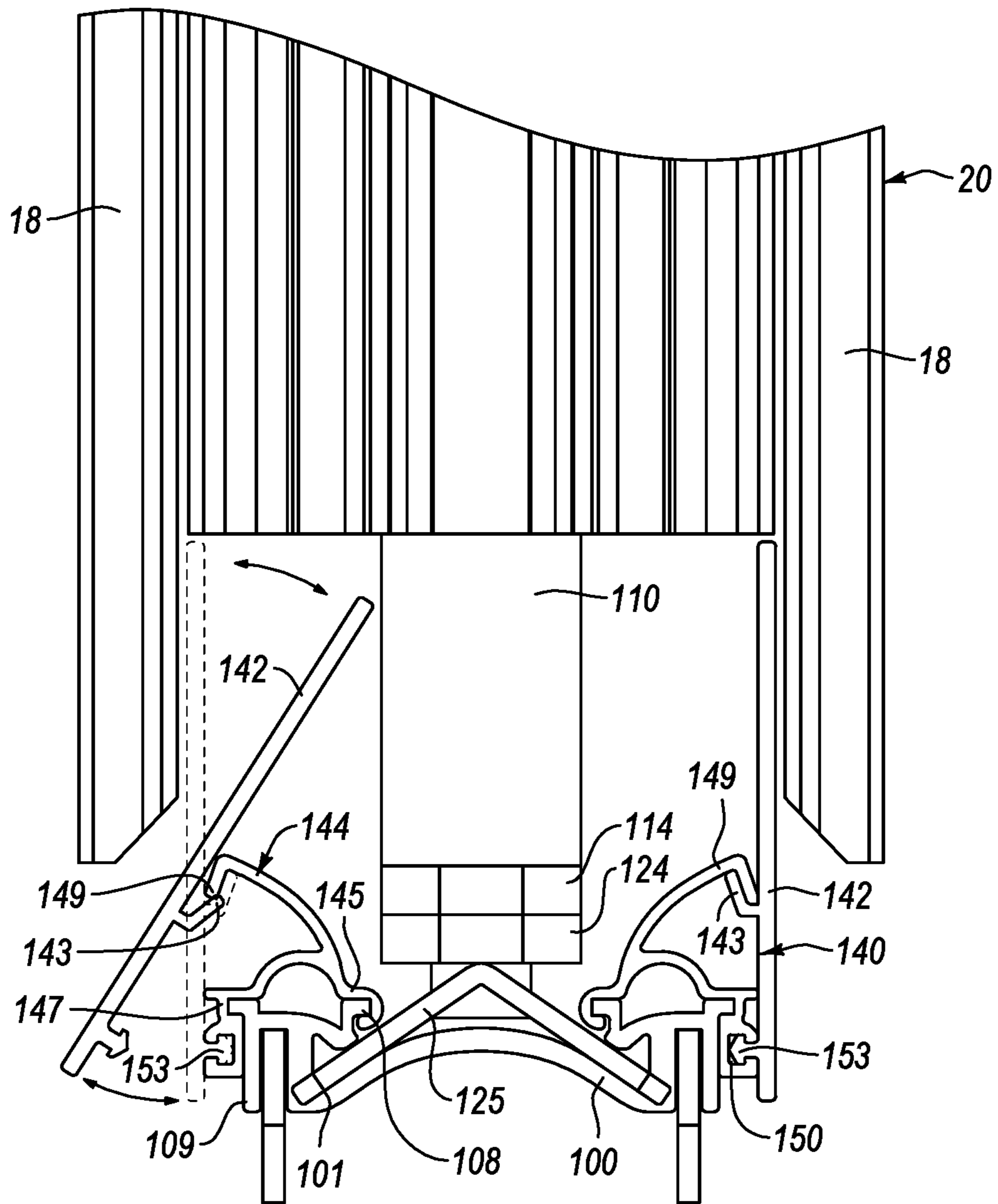


Figure 14

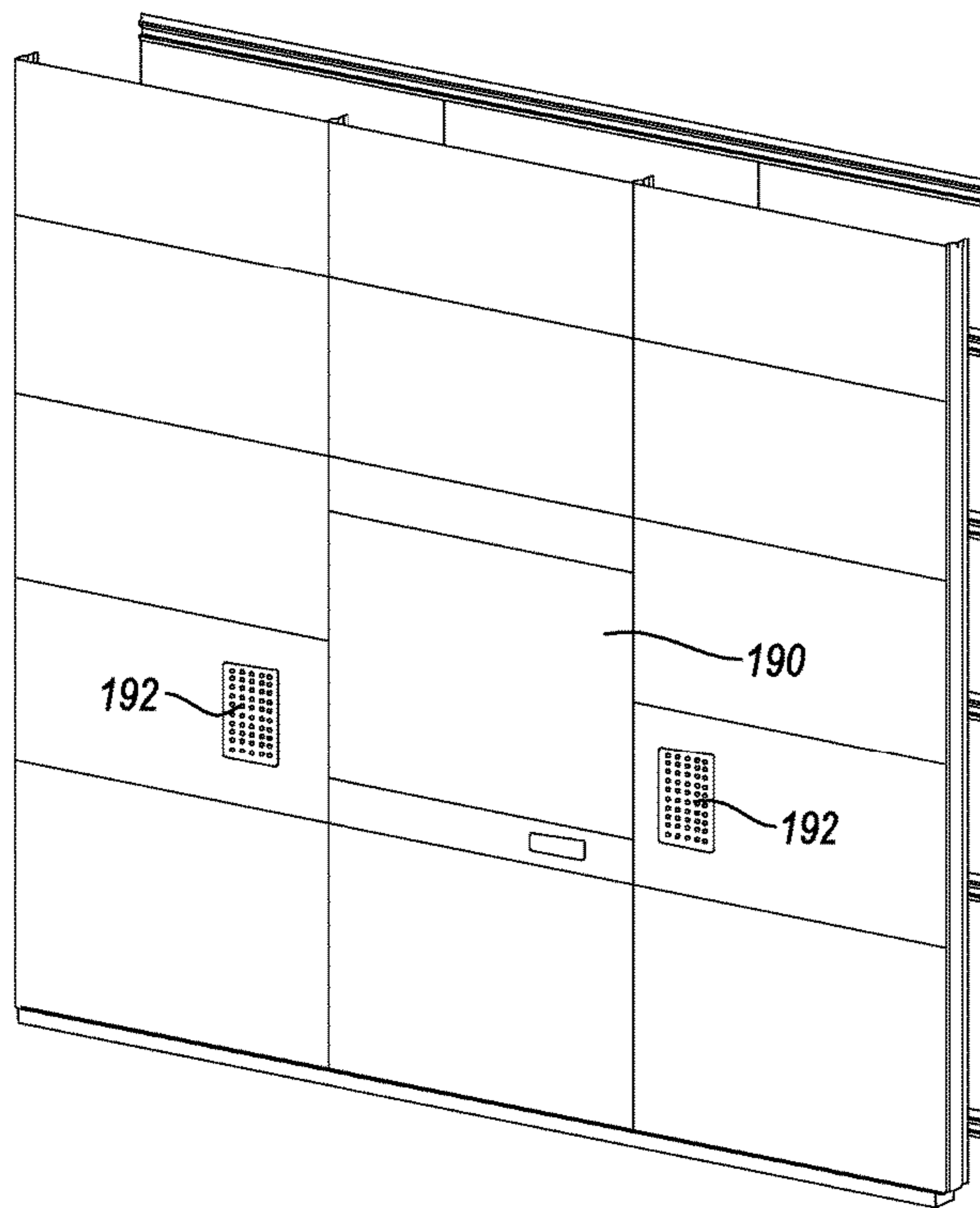


**AMENDED**  
**Figure 15**

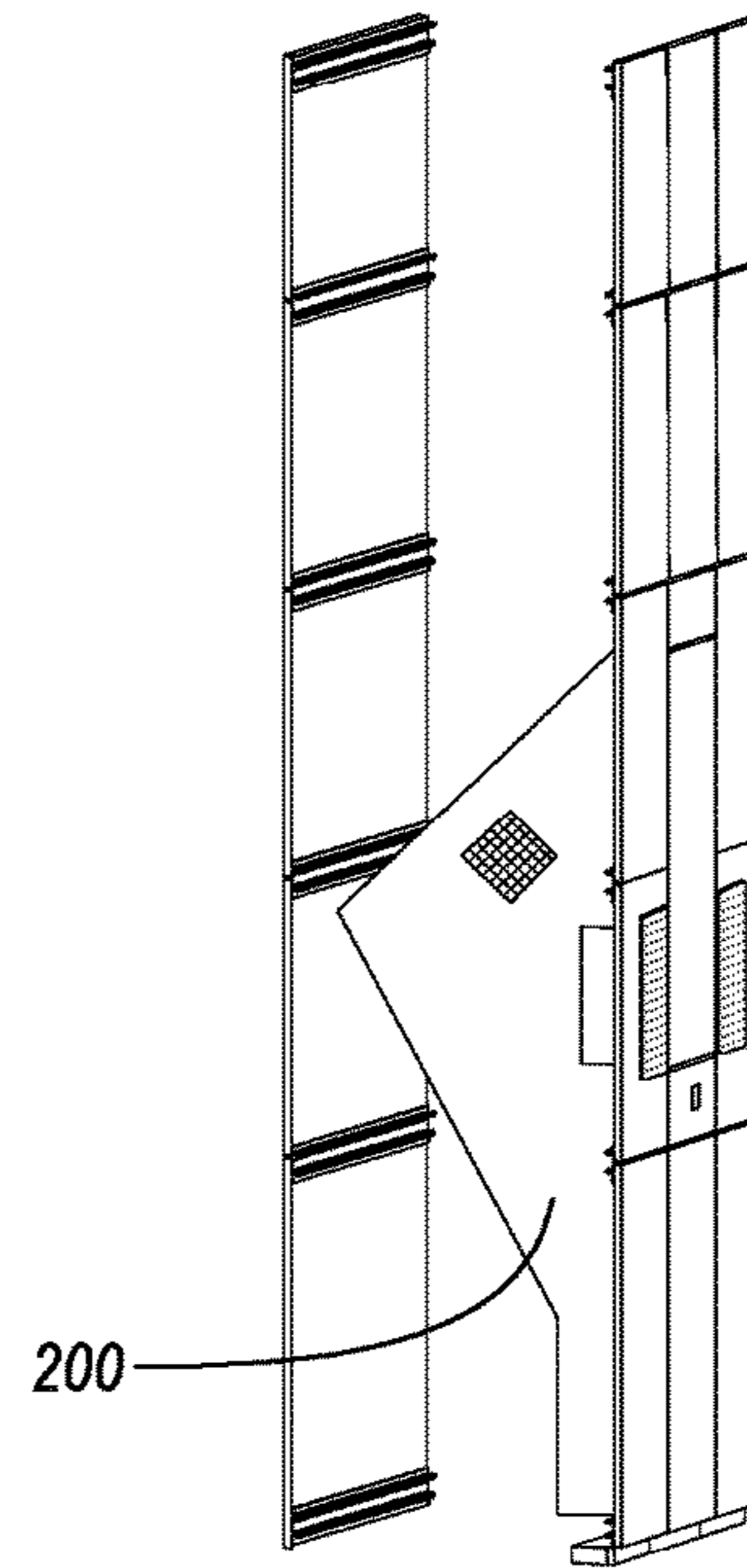


**AMENDED**  
**Figure 16**





AMENDED  
Figure 17



AMENDED  
Figure 18

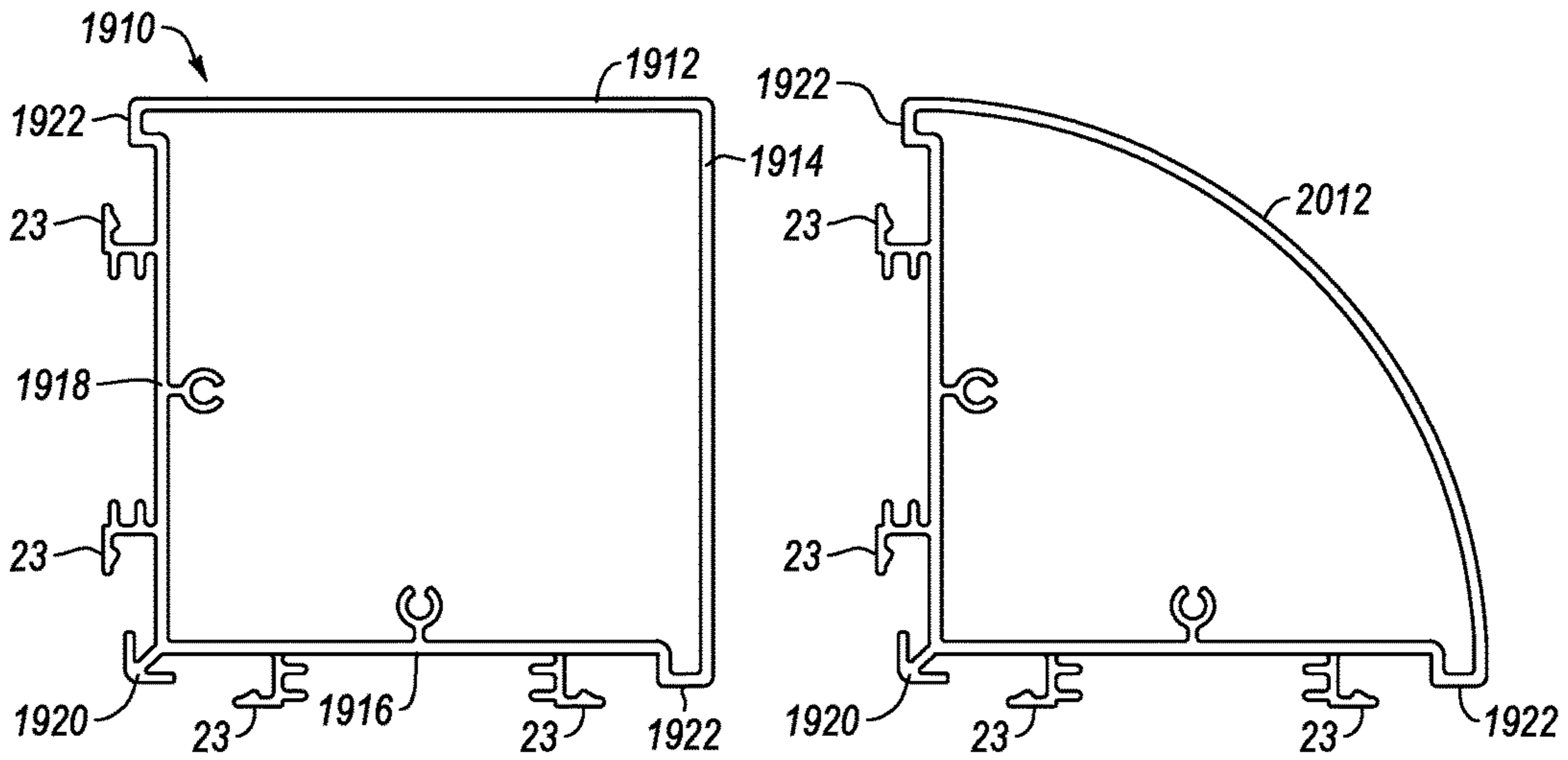


Figure 19

Figure 20

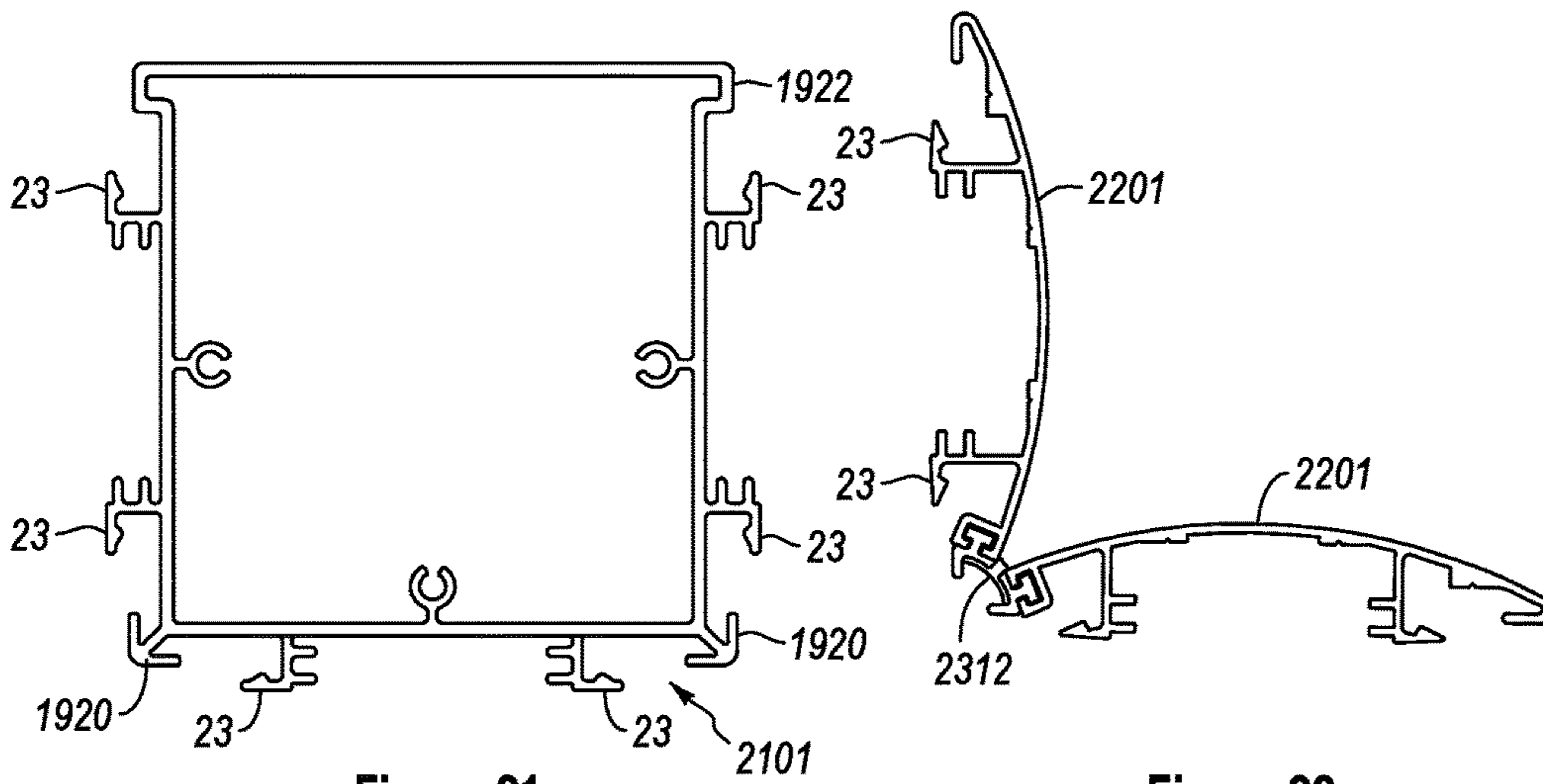


Figure 21

Figure 22

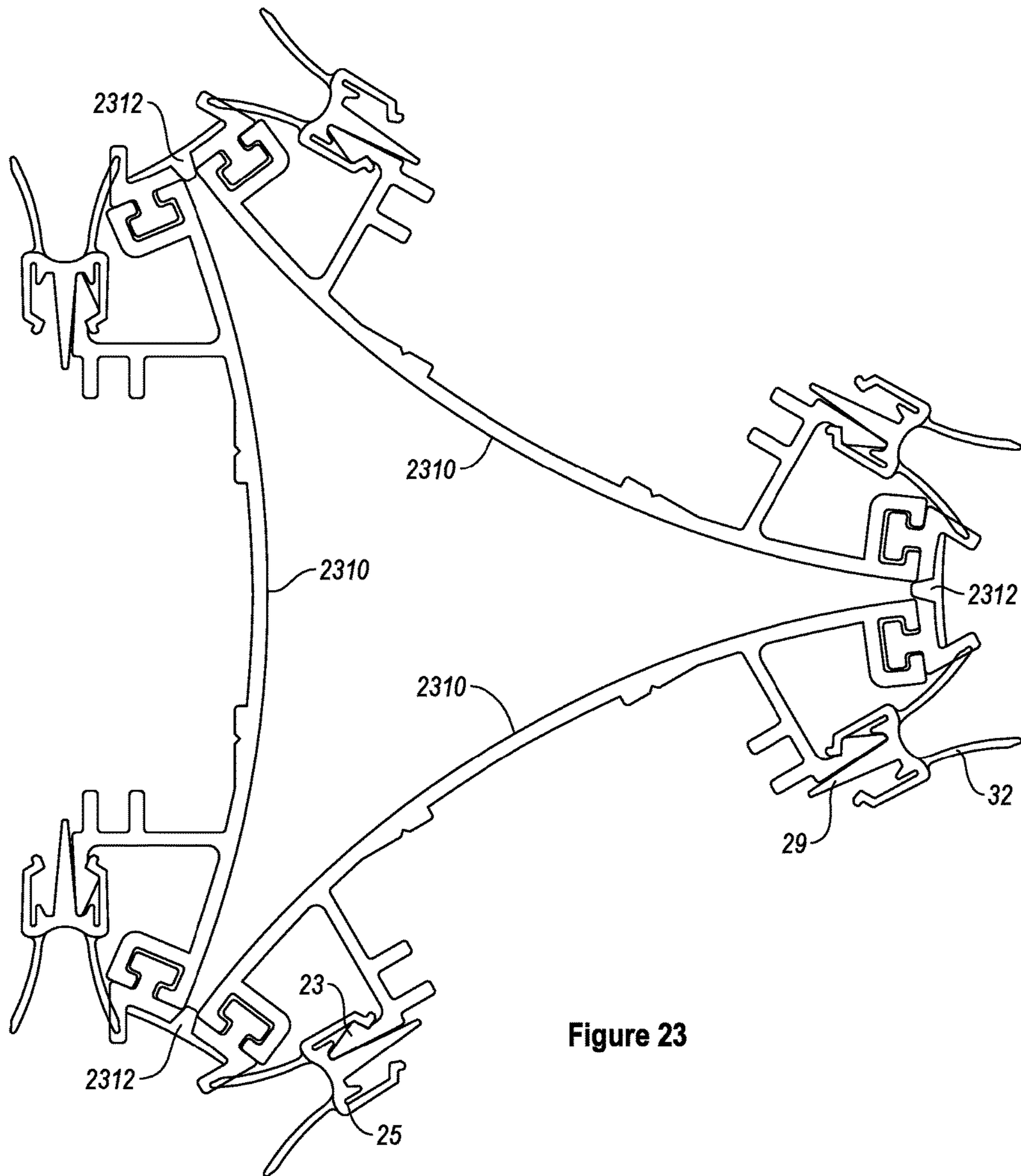
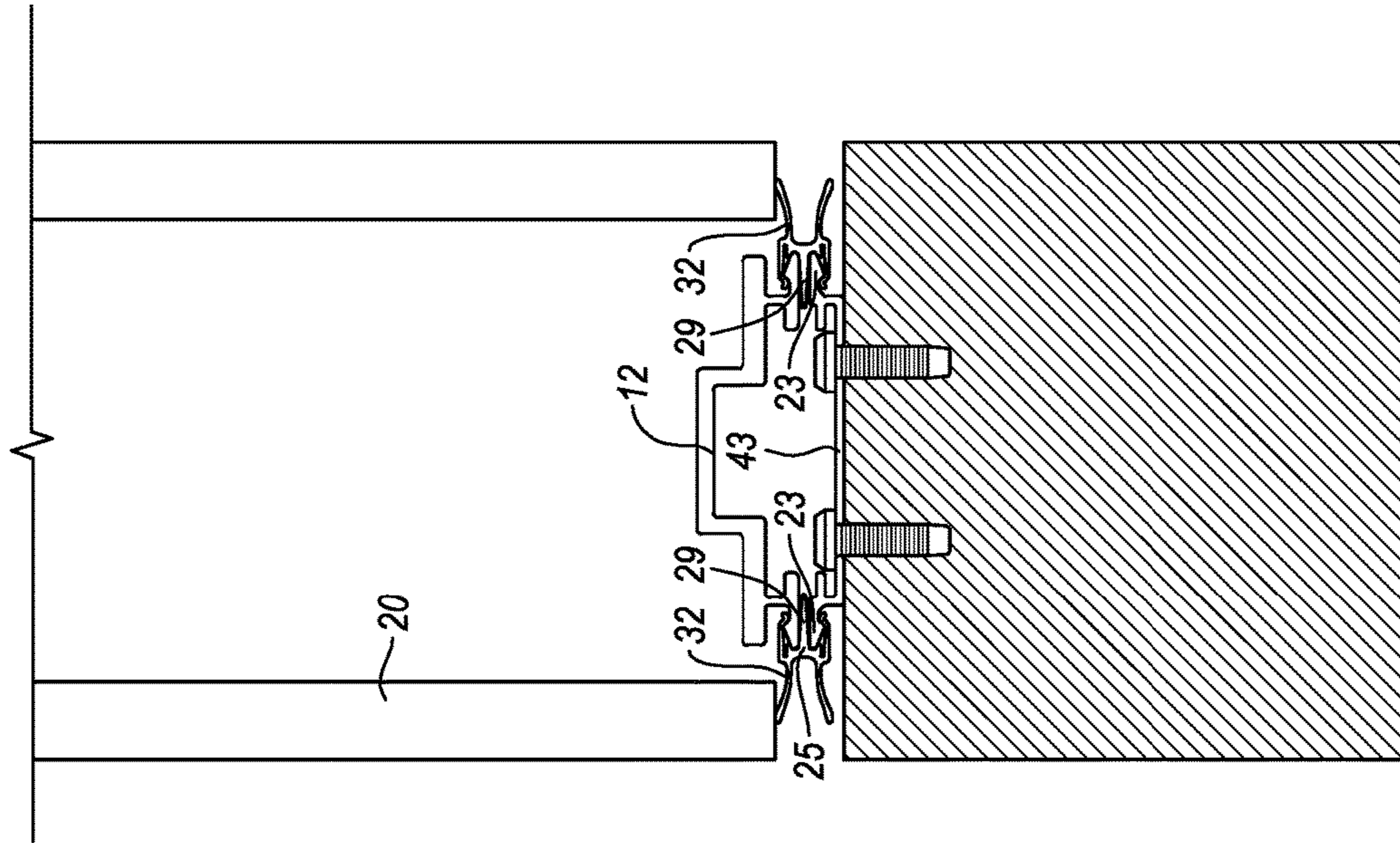


Figure 23



AMENDED  
Figure 25

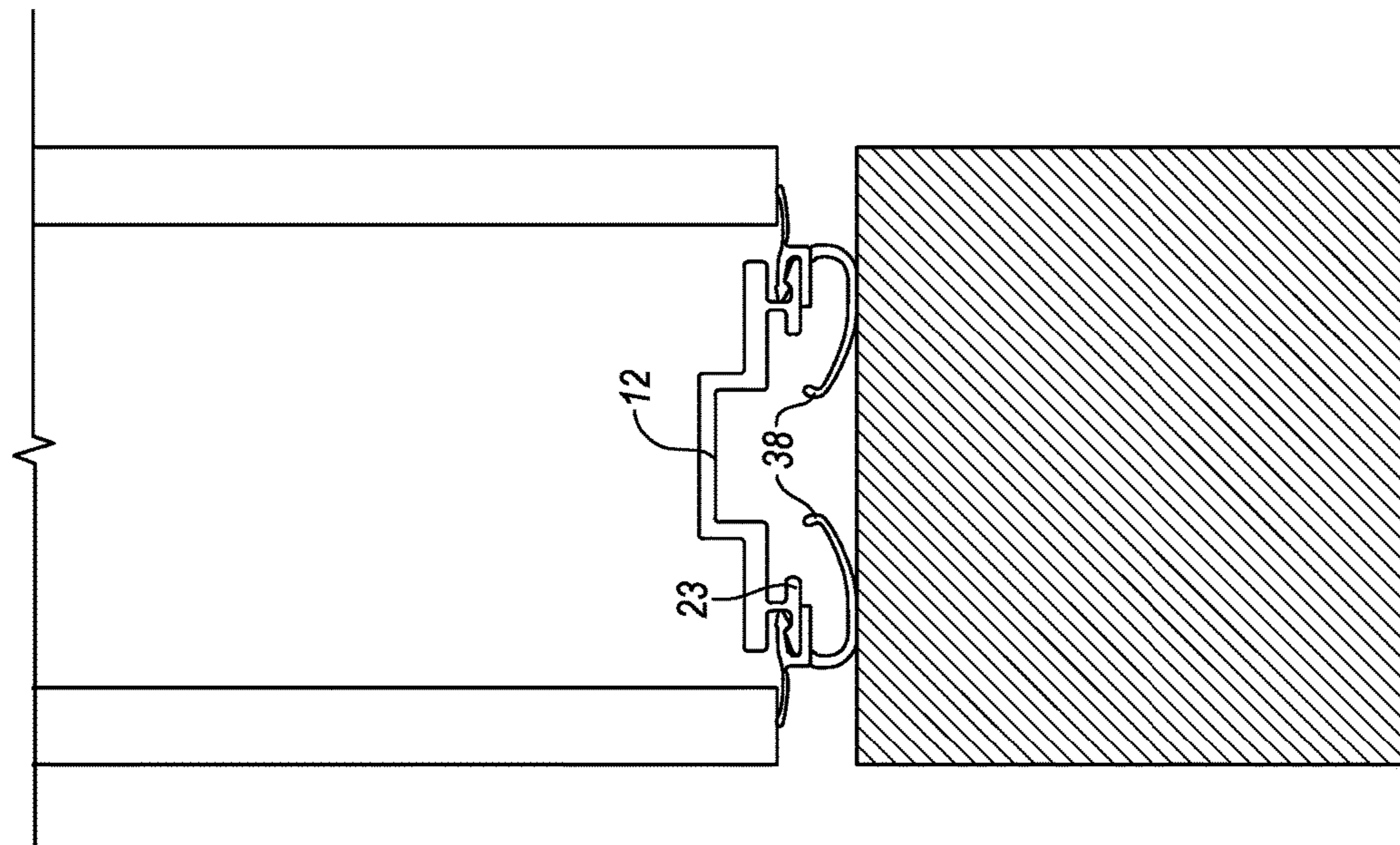
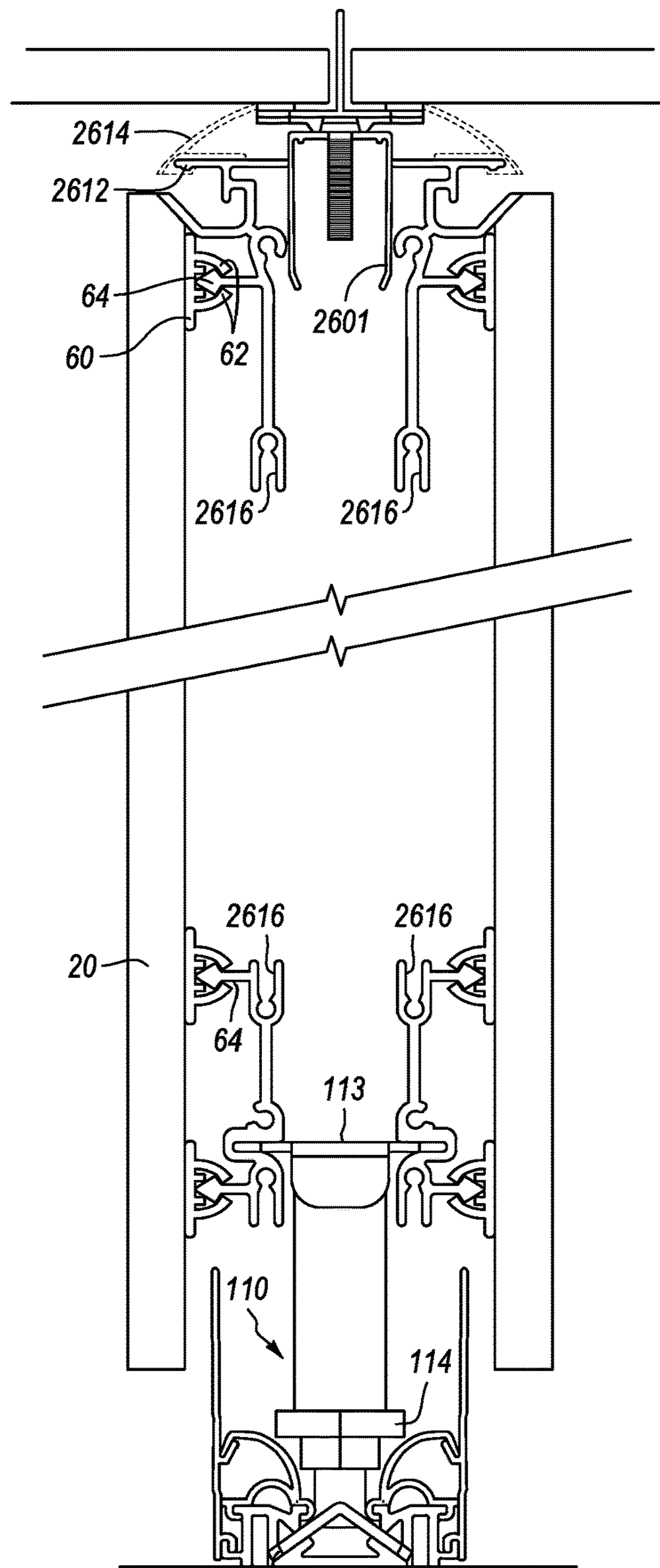


Figure 24



125 **AMENDED**  
**Figure 26**

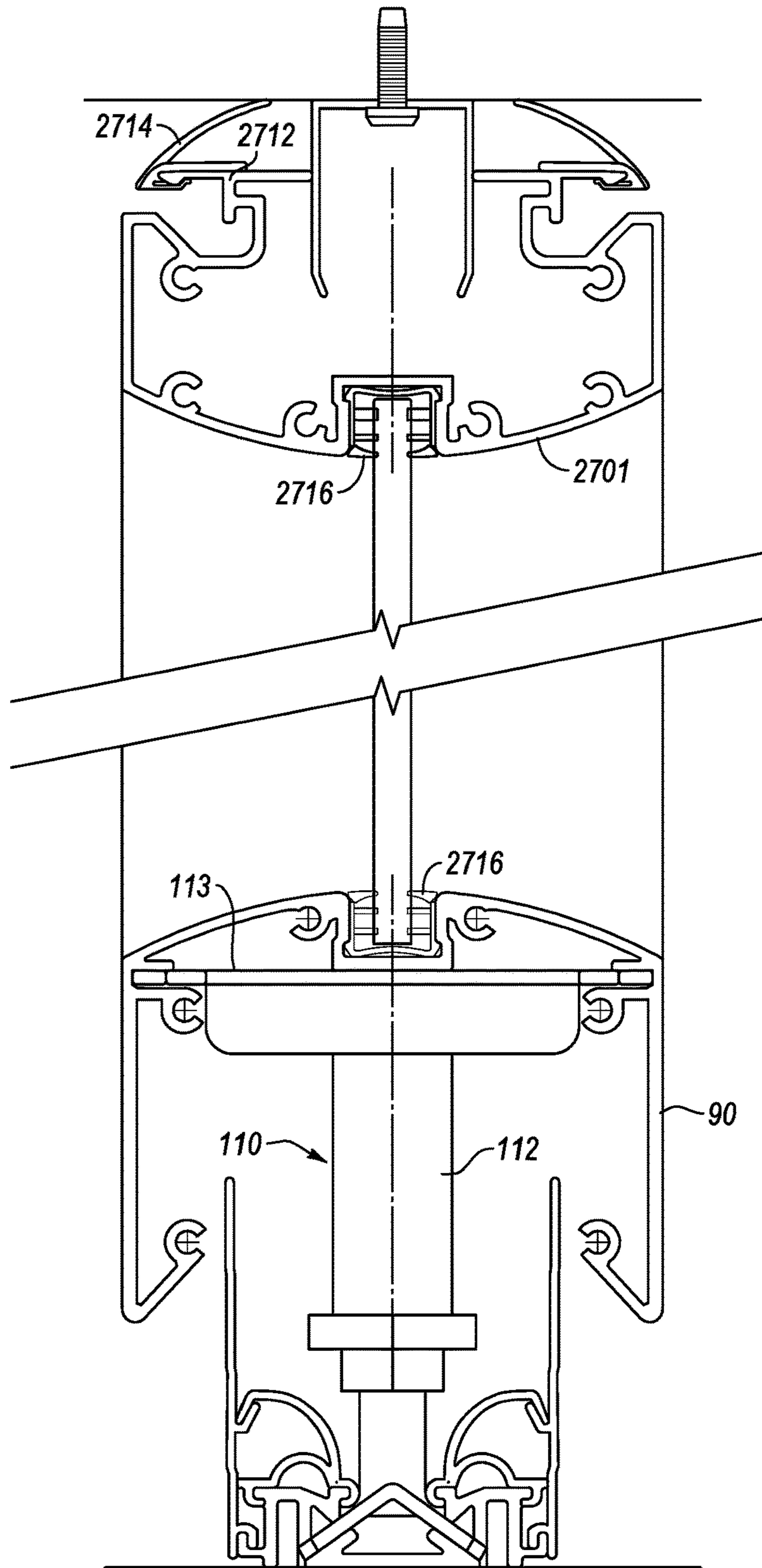
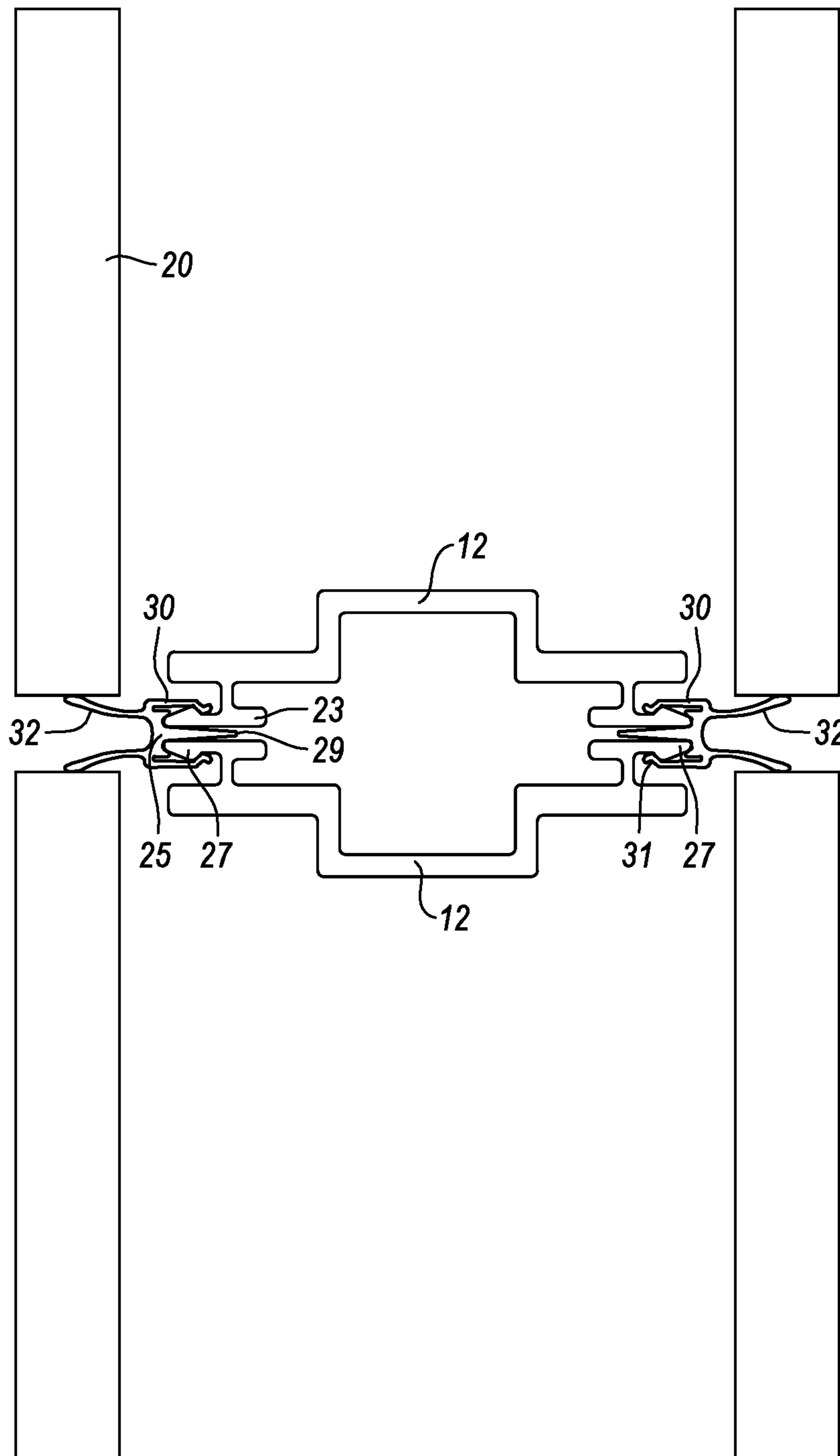


Figure 27



**AMENDED**  
**Figure 28**

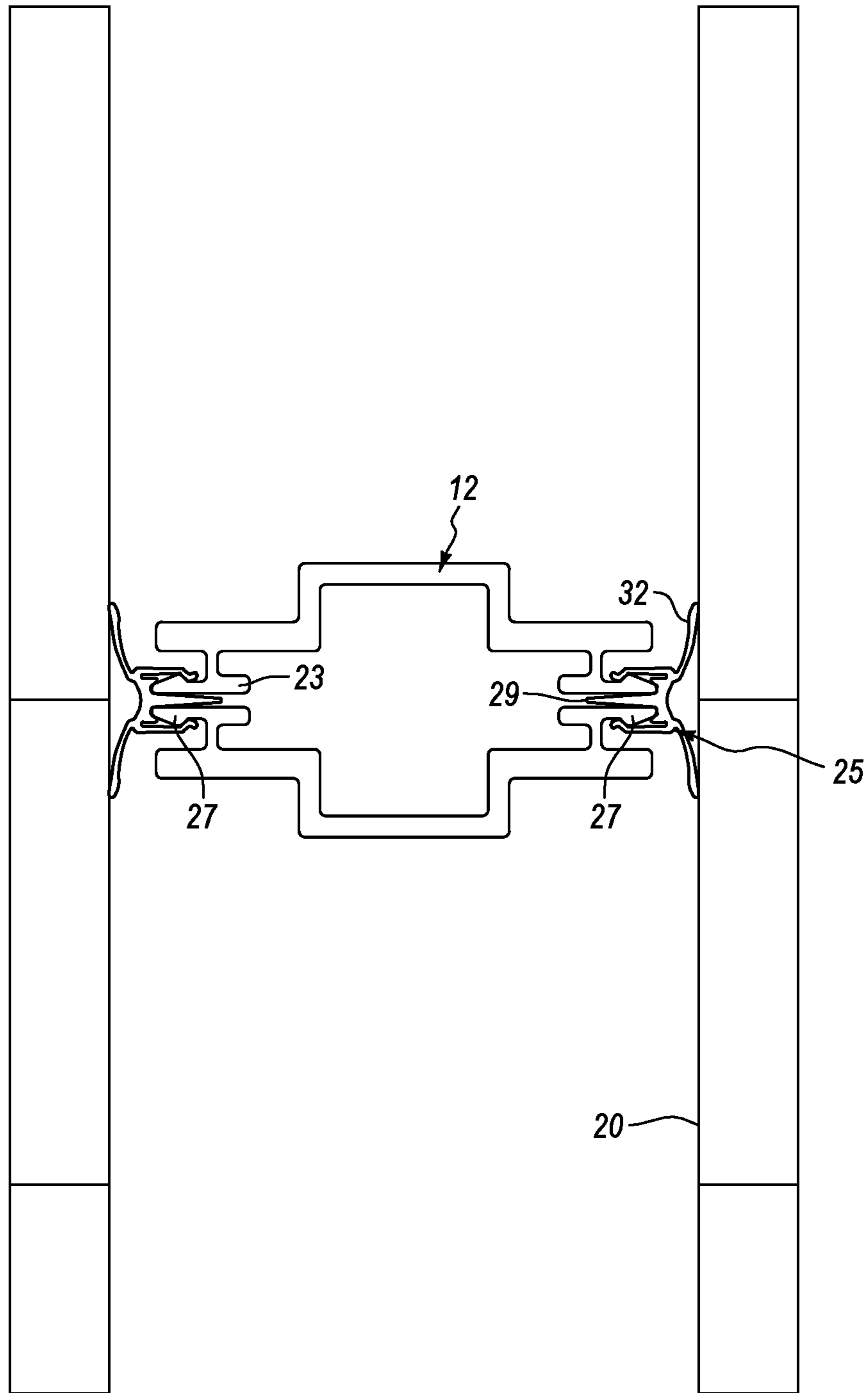


Figure 29



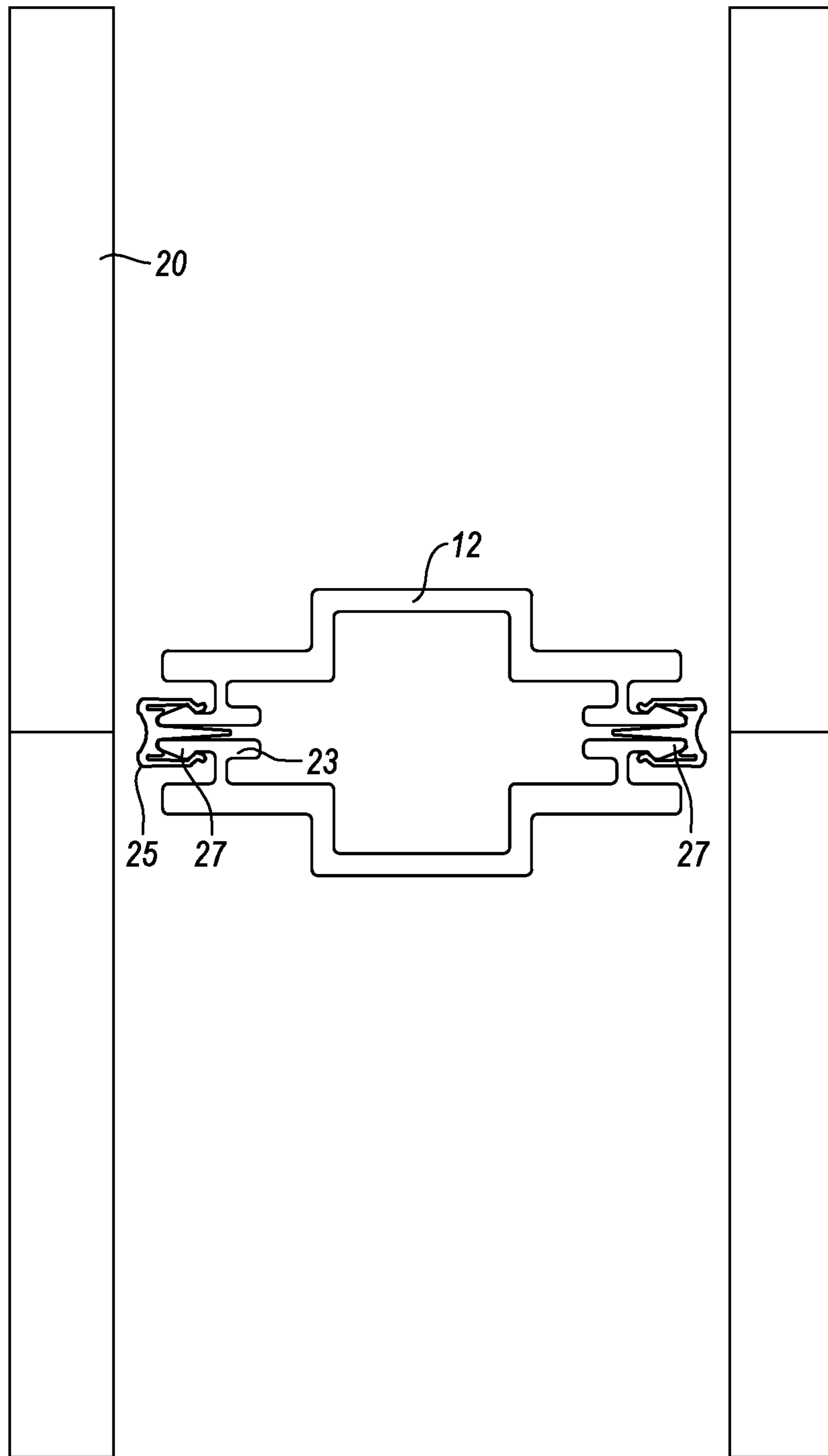


Figure 30

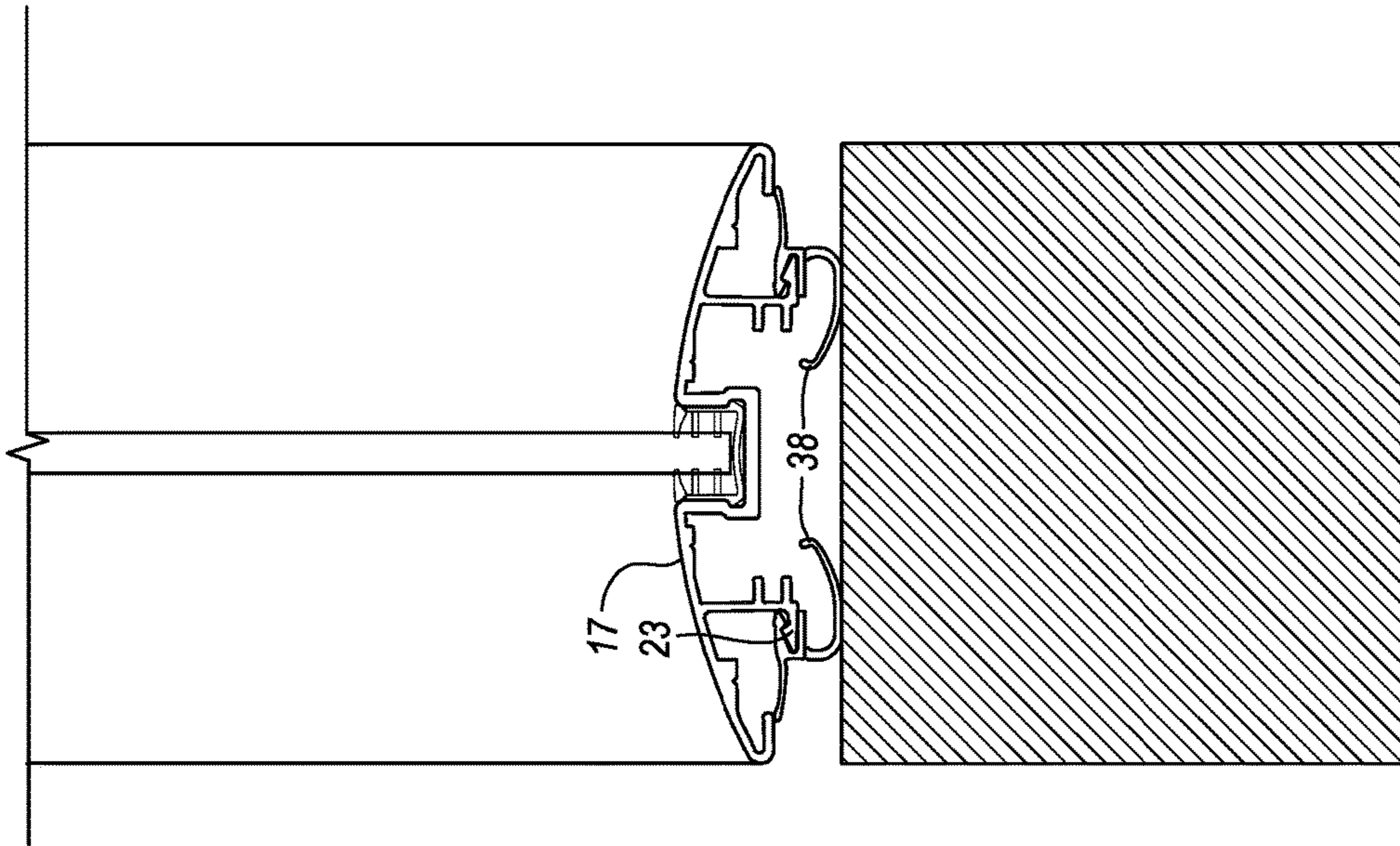
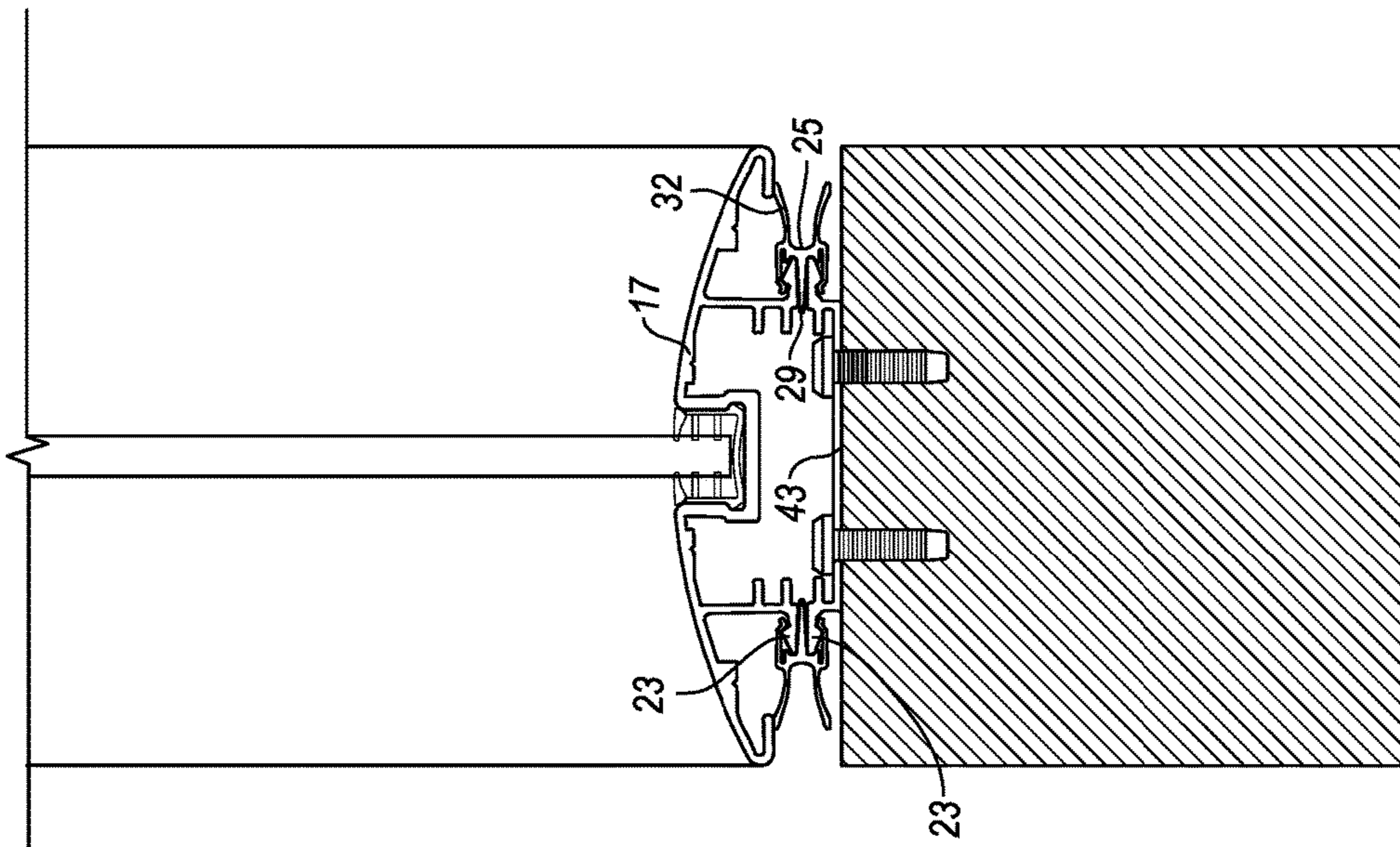


Figure 32



AMENDED  
Figure 31

## INTEGRATED RECONFIGURABLE WALL SYSTEM

**Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.**

### CROSS-REFERENCE TO RELATED APPLICATIONS

**[The present invention]** *Notice: More than one reissue application has been filed for the reissue of U.S. Pat. No. 8,024,901. The reissue applications are the present application, application Ser. No. 14/032,931, application Ser. No. 14/305,819, and application Ser. No. 15/074,383. Application Ser. No. 14/032,931 was filed on Sep. 20, 2013 and is a reissue of U.S. Pat. No. 8,024,901. Application Ser. No. 14/305,819 was filed on Jun. 16, 2014 and is a continuation reissue of application Ser. No. 14/032,931. Application Ser. No. 15/074,383 was filed on Mar. 18, 2016, and is a continuation reissue of application Ser. No. 14/032,931. This application is a reissue divisional of application Ser. No. 14/032,931, which is an application for reissue of U.S. Pat. No. 8,024,901, which claims the benefit of the filing date of U.S. Provisional Patent Application Ser. No. 60/601,985, entitled "INTEGRATED RECONFIGURABLE WALL SYSTEM", filed Aug. 17, 2004. The present invention is also a reissue of U.S. Pat. No. 8,024,901.*

### FIELD OF THE INVENTION

The present invention relates to a wall moveable system, and more particularly to a reconfigurable moveable wall system comprising reconfigurable components and design elements.

### BACKGROUND OF THE INVENTION

Wall systems, or dividers as they are sometimes called, are used most commonly in an office environment to separate work areas and to give people privacy where permanent walls are lacking. It is beneficial to have a wall system that is easily movable and easily reconfigured given the ever changing needs and requirements in these environments. Another important aspect in an office is to maximize available space. Aesthetics are also important, including the ability to provide the aesthetic element independently of underlying structural componentry.

Previous wall systems have lacked some or all of these attributes. Some are difficult to reconfigure or to move without significant amounts of labour and dislocation. Most systems lack the flexibility to quickly change the height of a wall, or to use or substitute different types of panels, or replace a module in the middle of a wall without taking apart the entire wall. There also is a need to be able to use the wall system against an existing wall as a curtain wall for an integrated look and to provide the design flexibility needed in those spaces bordered by permanent walls.

### SUMMARY OF THE INVENTION

In a preferred embodiment, the present wall system comprises at least one module, where each module includes a

frame and a plurality of tiles mounted to the frame by means of a tile clip system. Clips are attached to the rear surface of each tile and the tile is then pressed into place, aligning the clips with a capture detail on the horizontal frame stringers. Tiles can span adjacent frames where required. Horizontal frame stringers may include a cantilever channel detail where desired to allow objects to be hung along the width. A single frame comprised of two verticals frame members and a plurality of horizontal stringers mounted to an existing wall by connecting the horizontal members to brackets attached to the existing wall allows tiles to be mounted as a curtain wall on the existing wall. Two frames may be supported back to back within a framework for modules used to divide adjacent work spaces. A spline is attachable to the top of the frame to extend the frame and allow for additional tiles to be added on to increase a module's height if so desired. The spline is also used to connect a different style of frame above the existing frame if so desired. For example, this allows a framed glass module to be attached above a framed wood substrate module. Two adjacent modules are connected using a removable zipper interface. The zipper contains two flexible gasket components. Where tiles will span adjacent frames or meet one another without a gap, the gaskets bend back behind the tiles. Where tiles do not span adjacent frames and a gap is wanted, the gaskets point outward from the frame, between the tiles. At the edge of a module where no other module is to be connected, a starter strip may be placed, wherein the starter strip includes an integral flexible gasket which conforms to the shape of the surrounding environment while providing both light and sound baffling. The cantilever channel between tiles allows for various accessories or mill work to be supported from the outside of the module at convenient locations and to be adjusted as needed.

The present wall system also includes a glass wall module, where each module includes a frame and a plurality of glass tiles mounted within the frame. The glass may be center mounted, front mounted or rear mounted. A channel within each end frame extrusion holds a full length gasket extrusion or notch. The glass is retained within the gasket extrusion, around the full perimeter of the glass tile. Extra horizontal or vertical extrusions are attached within the frame to further divide the module into smaller areas.

The present wall system also includes levelers. Levelers include upper, middle and lower sections. The upper section includes a hollow cylinder which is threaded along the interior, and a flat upper plated perpendicular to the leveler. The middle section is a hollow cylinder where the interior and exterior surfaces are threaded in opposite directions, with a fixed nut at one end of the middle section for adjustment. The lower section includes a solid cylinder threaded to correspond with the middle section, a fixed lower nut and an inverted V-shaped lower plate. The leveler is used by having the flat plate in the upper section engage a continuous channel in an the lowermost extrusion of a module's frame, and the lower plate engaging a continuous universal foot, located beneath each module. The V-shape of the lower plate distributes the weight of the wall in the direction of the connection channels of continuous universal foot. A leveler can be placed at any location along the width of the module, allowing for a plurality of levelers to be used if needed. Along the base of the universal foot is a plurality of grippers, which can be adapted for either carpet or hard flooring surfaces. The attachment of the leveler to the module is secure and without extra fastener requirement of any sort. Sliding the leveler plates into the extrusion chan-

3

nels, followed by the attachment of subsequent vertical members, secures the levelers in place.

A base trim is provided which, in one embodiment, can be removably secured to the universal foot to provide access to the levelers when needed but which otherwise provides a finished look to the modules. The base trim can be modular, or span multiple frames.

Wall modules can be adapted to include integrated rear projection video systems or digital whiteboards. Front projection screens or whiteboards can be mounted within the frame confines, or spanning adjacent frames.

The present wall system provides for true curved walls. Curved wall frames are comprised of straight vertical extrusions and stretch formed horizontal extrusions which are curved to the required radius. Glass or other substrate tiles are curved to match the radius of the frame and mounted in the same manner as planar wall modules.

The present wall system can incorporate universal slat wall constructions which would accept all standard slat wall accessories. The slat wall component is a horizontal structural extrusion, interlocking above and below the cantilever channel horizontal member or other slat wall extrusions.

The present wall system can also support desktops and work surfaces using support brackets in the cantilever channel.

The present wall system also integrates completely with a related furniture panel system. A furniture panel system is comprised of a frame and plurality of tiles attached to the frame. The furniture panel system is designed to serve as cubicle type dividers or desk type units, rather than full height walls. The integration to the furniture panel system is seamless, as the zipper connection detail, tile clip capture detail and cantilever detail are identical to the wall system connection details. All components used in or on the wall system can also be used in or on the furniture panel system.

According to the present invention then, there is provided a movable reconfigurable wall system comprising: at least one module having a front and rear surface, said at least one module having: vertical end frames disposed at least at its side edges, each said vertical end frame having a vertically extending flange directed toward said front surface and a vertically extending flange directed toward said rear surface; a plurality of horizontal stringers affixed between said pair of vertical end frames; and an aesthetic surface affixed to said stringers; and a removable connecting strip, said connecting strip adapted to affix about one of said two flanges on one of said vertical end frames and join said one of said two flanges to a corresponding flange on one of a second module, a wall bracket, a finishing trim or a connection post.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the applicant's integrated reconfigurable wall system will now be described in greater detail and will be better understood when read in conjunction with the following drawings in which:

FIG. 1 is an exploded perspective view of a module representative of the present tile clad wall system;

FIG. 1A is another exploded perspective view of a module representative of the present tile clad wall system;

FIG. 2 is a perspective view of a wall system including two adjacent modules, one tile clad and one glass wall;

FIG. 3 is an enlarged view of a portion of the wall system of FIG. 3 showing the connection between adjacent modules;

FIG. 4 is an exploded view of FIG. 3;

4

FIG. 5 is a perspective view of a frame member including a finishing trim;

FIG. 6 is a perspective view of a frame member including a wall starter trim where a module meets an existing wall;

FIG. 7 is a perspective view of a height extension to an existing module;

FIG. 8 is a perspective view of a portion of a wall module showing the orientation of horizontal members with integrated cantilever channel;

FIG. 9 is an enlarged view of a portion of FIG. 8 showing cantilever bracket details and tile clip connection details;

FIG. 10 is a perspective view of a wall panel incorporating slat wall construction;

FIG. 11 is a side elevational view of the slat wall construction of FIG. 10;

FIG. 12 is a perspective view of the related panel furniture system utilizing the same connectors and slat wall extrusion to support a work surface;

FIG. 13 is a perspective, partially exploded view showing the assembly of a leg used to support the panel furniture system, utilizing the same connection zipper as the wall components of FIG. 12;

FIG. 14 is a perspective, exploded view of a leveller for use with the present wall system;

FIG. 15 is a perspective view of one embodiment of a leveller mounting system as it slides into the channel of a lower glass wall extrusion and universal foot extrusion;

FIG. 16 is a side elevational view of the base trim connection to the leveller assembly;

FIG. 17 is a perspective, schematic view of the present wall system including integrated media panels and storage areas;

FIG. 18 is a perspective, schematic view of the present wall system incorporating an integrated media center;

FIG. 19 is a plan view of a two-way rectilinear connector for the present wall system;

FIG. 20 is a plan view of an alternative (radial) two-way connector for the present wall system;

FIG. 21 is a plan view of a three-way connector for the present wall system;

FIG. 22 is a plan view of a variance of a 90 degree connector for the present wall system;

FIG. 23 is a plan view of a 120 degree connector for three merging walls according to the present wall system;

FIG. 24 is a plan view of an end vertical and gasket for abutting existing walls with the present wall system;

FIG. 25 is a plan view of a connector for connecting to existing walls according to the present wall system;

FIG. 26 is a side elevational view of a floor leveller and ceiling connector for a solid (tile clad) wall;

FIG. 27 is a side elevational view of a floor leveller and ceiling connector for a glass wall;

FIG. 28 is a plan view of two wall panels having a gap between adjoining panels;

FIG. 29 is a plan view of two wall panels directly abutting each other and being sealed with a zipper;

FIG. 30 is a plan view of two wall panels directly abutting each other and having a zipper with no fins;

FIG. 31 is a plan view of an end vertical and gasket for abutting existing walls with the present glass wall system; and

FIG. 32 is a plan view of a connector for connecting to existing walls according to the present glass wall system.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIG. 1, the present invention is directed towards a wall system 10 made up of one or more modules

20. Each module comprises a pair of vertical end frames 12 that will be spaced apart by the desired width of each module. Modules 20 may be clad with tiles 18 and can be one or two sided with a finished wall surface on both sides or a finished wall surface on one side only. Tiles 18 can be made of wood, plastic, metal fabric glass or other material, and end frames 12 may be interconnected by a plurality of horizontal stringers 8 that will be described in greater detail below.

With reference to FIG. 2, the next adjacent module 20 can be identical to its neighbour, or, as shown in this figure, may consist of two vertical end frames 17 and one or more dividers 14 which can be, for example, glass or plastic if transparency is desired. End frames 17 used for such dividers are shaped as shown most clearly in FIG. 4 and include a notch 19 that receives and holds the divider's vertical edge.

Stringers 8 are horizontally spaced apart at intervals along the height of the module for strength and rigidity. To support objects, cantilever channel stringers 40, including a cantilever channel portion 41, are used, as shown in FIGS. 8 and 9. Stringers 8 that do not include channel portion 41 can be used anywhere structure is required but the channel portion is not required for supporting objects. For example, the lowest stringer 8a may not include cantilever channel portion 41. The stringers are connected to end frames 12 by fasteners, usually threaded screws, in a manner to be described below.

If the module will be visible from both sides, finishing tiles 18 can be connected to the stringers on both sides of module 20. It is not necessary that the tiles on one side of the wall be at all like the tiles on the other. They can be different materials or even aligned differently as shown in FIG. 1, in which the tiles on one side of the module are horizontally mounted and the tiles on the other side of the wall are vertically mounted for a different look. The tiles can also span adjacent modules, if required. For example, FIG. 1A depicts finishing tiles 18 spanning adjacent modules 20. If only one side of the module will be visible, which can be the case for example if the module is used as a curtain wall to cover an existing wall, its necessary to apply tiles 18 to only one side of the module as needed.

The depth or thickness of the module can be selected by varying the width of frame 12. For example, as will be described below, the modules can house a rear projection or digital video system and the greater depth is needed to enclose the componentry.

With reference to FIGS. 3, 4, 5 28 and 29, each end frame 12 and 17 includes a pair of rearwardly extending L-shaped flanges 23 that align vertically with correspondingly positioned and shaped flanges 23 on opposite end frame 12 or 17 so that frames 12 and 17 can be connected together by connecting strips ("zippers") 25. If the adjacent module 20 itself comprises an end frame 12 as shown in FIGS. 28 and 29, flanges 23 will abut and will be connected together in the same manner using zippers 25. As shown most clearly in FIG. 28, each of flanges 23 is formed with a bead 27. Each zipper 25 is generally T-shaped in cross-sectional shape and includes a central spine 29 that fits between flanges 23 and a pair of arms 30 on opposite sides of the spine. Each arm includes a bead 31 that snap fits with beads 27 on flanges 23 for a secure but releasable connection. When two adjacent modules are connected together in this way, there is enough of a gap between them that the zippers can be accessed for removal, allowing an individual module to be removed should the need arise.

As illustrated in FIGS. 28 and 29, each zipper can also include a pair of flexible extended fins 32 extending rear-

wardly from the spine 29. Depending on the application, a user may wish adjacent modules to be abutted together completely or to have a gap between them. In FIG. 28, a gap exists between the modules, and this gap is sealed using extending fins 32. As will be appreciated by those skilled in the art, the width of the gap is variable since extensions 32 are flexible and can accommodate various widths.

If no gap is desired, or if tiles span adjacent modules, FIG. 29 illustrates an embodiment having adjacent panels. In this case extensions 32 are behind each panel, and the force of extensions 32 against the rearward side of the module creates an acoustic seal for the wall.

In an alternative embodiment illustrated in FIG. 30, it is also possible to have a zipper 25 without extensions 32. This may be desirable when modules 20 abut and an acoustical seal is not required.

*As such, in various embodiments, the zipper 25 may be positioned in a recessed location within the wall system 10. The recessed zipper 25 may allow for a single tile 18 to span multiple modules 20 without interference from the zipper 25. Additionally, a recessed zipper 25 may allow for the free movement of accessories 47 between adjacent wall modules 20 within a cantilever channel 41.*

FIG. 5 shows an end piece 35 similar to end frame 17 but lacking notch 19. This end piece is therefore used to finish the vertical edge of module 20 using zippers 25 if no additional module is to be connected to it.

If either of frames 12 or 17 is to start, or end, at an existing wall, flexible starter strips 37 can snap-fit onto flanges 23 as shown most clearly in FIG. 6. Starter strips 37 include curved flexible gaskets 38 which will conform to the shape of the existing wall and will provide sound and light barriers. This can also be seen in FIGS. 24 and 32.

Alternatively, as illustrated in FIGS. 25 and 31, a wall start 43 can be mounted to an existing wall to provide a start to a module. Wall start 43 is preferably an aluminum extrusion mounted vertically to an existing wall using known mounting techniques. The mounting technique of screws shown in FIG. 25 is not meant to be limiting.

Wall start 43 includes a flanges 23 and is connected to an end frame 12 or 17 using a zipper 25. As indicated above, extensions 32 can provide a seal against the wall and panel.

To increase the height of an existing module 20, or to combine a glass module above or below a tile-clad module, a spline 39 can be used to connect end frame 12 (or 17) to an extension frame 12e as shown most clearly in FIG. 7. Actually, as shown in this figure, extension frame 12e is a length of frame 17, which allows the lower portion of the wall to be hung with standard tiles and the upper extended portion of the wall to be finished in a glass or plastic divider 14 for a combination of finished looks. The upper and lower extrusions 90, which complete the framing of divider 14, will be described below in connection with a levelling system in which the same extrusion is used.

It is desirable that work surfaces, mill work and wall accessories such as trays or document holders be connectable to modules 20. This can be easily achieved in the present system by using cantilever channel stringers 40 with channel brackets horizontally disposed in the channel between adjacent tiles 18 as shown most clearly in FIGS. 8 and 9.

Each channel stringer 40 includes a central horizontally extending channel portion 41 with a generally L-shaped slot 42 formed along its length adapted to receive and engage a substantially L-shaped hook 45 formed on a wall accessory 47 such as the document holder shown in FIG. 8. A pair of diagonally extending webs 49 connects channel portion 41

to upper and lower portions **51** and **53** respectively. Each portion includes a tile support **55** that is the connection point for the tiles **18** that are mounted above and below channel portion **41**. More specifically, the upper and lower edges of tiles **18** are provided with a *tile clip*, e.g., connector strip **60**, which is attached by means of screws, adhesive or any other suitable fastening to the rear surface of tile **18**, as illustrated. Each connector strip **60** includes a pair of opposed flexible arms **62** to snap-fit with a protrusion (generally arrow shaped bead **64** formed along the edge of flanges **67**) that [are] is formed on and [extend] extends the length of each upper and lower portion **51** and **53**. This allows individual tiles **18** to be removed or replaced without having to disassemble the entire wall. The flanges **23** formed on vertical end frames **12** and **17** that are connected together by zippers **25** are located sufficiently inwardly that the zippers will not interfere with the continuity of slot **42** from one module to the next so that wall accessories, mill work or work surfaces can be connected or moved between modules without interference.

The upper and lower edges of tiles **18** that abut channel portion **41** of each channel bracket are camphored for clearance as seen most clearly in FIG. **9**.

The upper and lower portions **51** and **53** of the channel stringer **40** are advantageously formed with longitudinally extended circular recesses **57** and inner channels **58**. Recesses **57** are adapted to receive screws used to connect end frames **12** or **17** to channel stringers **40**. Channels **58** can be used to support mounting hardware for audio-video equipment mounted within the modules, cable management clips or any other hardware to be housed or contained in the module's interior. Channels **58** are also used to connect a single-sided tile clad module to brackets attached to existing wall surfaces.

With reference to FIG. **10**, another embodiment of the invention is shown incorporating a section of standard slat wall **69** including slats **70** and slat wall channels **71** for connection to all slat wall accessories **47**. Slat wall panels can make up some or all of the panels incorporated into any one module **20** and the modules themselves are configured for use with end frames **12** and zippers **25** so that the modules themselves can be connected together in any desired combination. Slat wall modules can be one (FIG. **11**) or two sided (FIG. **10**) for use as either dividing or curtain walls.

As shown in FIG. **12**, in the applicant's related panel furniture system, a work surface or desktop **76** can be connected to modules **20**. The desktop **76** can hook into either cantilevered channel stringers **40** or into slat wall channels **71** and otherwise the construction of the individual modules **20** is the same as described above for wall system **10**. Furniture legs **80** shown in the example of FIG. **12** consist of a vertical frame **12** zipper connected to a finishing end extrusion **35** using zippers **25** as shown in FIG. **13**, in the same manner as the wall system **10**. The lower end of each furniture leg **80** is finished with a concentric sleeve **79** which conceals a threaded bolt **84** in the lower end of each leg which can be used for levelling.

As illustrated in FIG. **23**, three vertical extrusions **2310** are connected to each other to create the connection point for the three wall systems, and each wall meets the others at an angle of 120 degrees.

In the case of modules having tiles that extend all the way down to the floor, applicant has developed a leveller mounting system that allows levellers to be placed anywhere along the length of a module and extra levellers to be added where needed. There are two variations of the leveller mounting

system shown in FIGS. **15** and **16**, one to be used with modules comprising tiles **18**, and the other with modules using glass or plastic dividers.

Referring first to FIG. **15**, this is the levelling system to be used with modules having glass or plastic dividers extending down to floor level. This system includes a structural extrusion **90**, which is generally an inverted U-shaped channel with a notch **92** to engage the lower edge of the glass or plastic divider, and a universal foot **100**.

Extrusion **90** and universal foot **100** are interconnected by means of dual threaded levellers **110**, an example of which is shown in FIG. **14**.

Leveller **110** has three distinct sections, an upper section **112**, a middle section **115** and a lower section **120**. Upper section **112** is cylindrical in shape and is internally left or right hand threaded. A plate **113** is connected to the section's upper end for a permanent connection thereto. Middle section **115** is both internally and externally threaded. The external threads will match the direction of the internal threads on upper section **112** while the internal threads will be in the opposite direction to match the external threading of lower portion **120**. A fixed middle nut **114** is disposed at the lower end of middle section **115**. Nut **114** can be used to turn middle section **115** relative to the upper and lower sections of the leveller.

As mentioned, the lower section **120** of the leveller is externally threaded and the threading will be in the opposite direction to the internal threading of upper section **112**. In this way, each turn of nut **114** doubles the expansion or contraction of the leveller to halve the levelling time. The lower end of section **120** includes its own fixed adjustment nut **124** and an inverted V-shaped lower plate **125**.

FIG. **15** shows how leveller **110** is installed. Plate **113** aligns with channels **94** in extrusion **90** to be slidable along the length of the channel to any desired location. The V-shaped lower plate **125** aligns with and slides into grooves **101** in foot **100**. Those levellers that fit at the end of a foot are slightly modified to include tabs **126** at the outer corners of plate **125** which prevent the plate from moving inwardly. When vertical end frames **12** or **17** are attached to extrusion **90**, plate **113** is prevented from moving outwardly so that the leveller is held in its position at the very end of foot **100**. Frames **12** or **17** are connected to extrusion **90** by means of screws that thread into one or more of circular slots **117** in the extrusion.

If modules **20** are situated atop carpet, toothed carpet grippers **130** are inserted into slots **129** in foot **100**. If the modules are installed on hard surfaces, nonskid grippers can be inserted instead. The grippers can be placed precisely where needed to bear the modules weight and can be easily moved, replaced or switched over as needed.

FIG. **16** shows a leveller **110** installed on modules **20** and illustrates the installation of base trim **140** used to conceal the levellers **110** when they're not being adjusted. In this view, plate **113** is again slidingly received into channels formed in the module's lowermost extrusion and plate **125** is received into grooves **101** in foot **100**. The base trim **140** includes baseboards **142** and snap pieces **144**. Snap pieces **144** snap-fit onto foot **100** as shown with grooves **145** and **147** on the snap piece engaging flanges **108** and **109** on the foot. Each snap piece includes a longitudinally extending elevated hook **149** and a similarly longitudinally extending channel **150**. Each baseboard includes a hook **143** to engage hook **149** on the snap piece, and a bead **153** that snap fits into channel **150** to retain the baseboards in a vertical position to provide a finished look. Because the baseboards are installed

usually after the modules have been assembled together, the boards can span multiple modules for longer runs and fewer seams.

Reference is now made to FIGS. 26 and 27. As illustrated, besides the bottom connection with the leveller (as described with relation to FIGS. 15 and 16 above), a ceiling connection is also preferred.

FIG. 26 shows a ceiling connection for a solid wall, such as those described above having tile cladding. A ceiling track 2601 is affixed to the ceiling above the area for the desired wall. Each module includes two horizontal uppers 2610 abut thereto (on either side of the ceiling track), the horizontal upper including an upper flange 2612. A ceiling trim 2614 is affixed to upper flange 2612. Ceiling trim 2614 is flexible and allows variable spacing of the wall with the ceiling. Specifically, the trim 2614 will flex to allow the wall to move closer or further from the wall as required based on levelling needs.

Horizontal upper 2610 further includes a *protrusion* (bead 64) as described above to attach a tile (*e.g., via the flexible arms of the illustrated tile clips*) to the horizontal upper. Further, recesses 2616 are used to attach horizontal uppers to frames 12 or 17.

To affix a wall, an installer can first install ceiling track 2601 in the correct location. The wall is then created with levellers 110 in a lowermost position. The levellers 110 are then extended to level the wall and to further cause horizontal uppers 2610 to abut ceiling track 2601 on either side of ceiling track 2601, as illustrated in FIG. 26.

Alternatively, if a divider such as a glass panel is being used, a one piece upper 2701 can be used, as illustrated in FIG. 27. The one piece upper 2701 comprises a flange 2712 to connect a ceiling trim 2714 to. Ceiling trim 2714 is preferably the same as ceiling trim 2614. Upper 2701 further includes a channel 2716 for receiving a divider.

The present wall system 10 includes curved walls using curved aluminum stringers and extrusions and curved tiles 18. In conventional systems, curved walls are constructed of faceted panels rather than true, radii arcs. A curved wall is illustrated in FIG. 19.

With reference to FIG. 17, a module 20 is shown in which a couple of tiles 18 have been replaced with an integrated media panel 190. The panel can be a Fresnel lens, a plasma screen, an LCD screen or a digital whiteboard. Rear projection technology can be used to project images onto the Fresnel lens, or the digital whiteboard technology allows sketching, writing, layout or computer screen emulation. In the example shown, adjacent tiles 18 incorporate speakers 192 to provide sound. Tile 18 surrounding the screen area can be used for integrated storage areas.

With reference to FIG. 18, there is shown schematically a module 20 with an integrated media center 200 suspended therein.

Various connectors are also provided to allow the present reconfigurable wall system to form corners. Reference is now made to FIGS. 19, 20, 21 and 22.

FIG. 19 illustrates a two-way rectilinear connector 1910. Connector 1910 includes a finished outer surface on sides 1912 and 1914. Further, flanges 23 are provided on sides 1916 and 1918. Flanges 23 can be used with zipper 25 to connect to end frames 12 or 17. An extension 1920 extends between sides 1916 and 1918 to form a finished corner once modules 20 are connected to these sides. Further, sides 1912 and 1914 include an elongate end 1922 for hiding zipper 25 and creating a finished surface.

FIG. 20 is similar to FIG. 19, with the principle difference being the radial finished outer surface 2012 replacing sides

1912 and 1914. Otherwise similar reference numerals are used between FIGS. 19 and 20.

FIG. 21 illustrates a three way connector for a "T" connection. Three modules 20 are connected to connector 2101. Connector 2101 includes a finished outer surface 2112. Flanges 23 are used to connect modules 20. Extensions 1920 provide a finished look between adjacent modules 20. Further, elongate end 1922 provides a finished look on the outside of the wall.

FIG. 22 illustrates an alternative 90 degree connector. In this case, an extrusion 2201 is affixed to the end of a module 20. Two extrusions are connected using a connector 2312. Since connector 2312 is flexible, an angle greater than or less than 90 degrees is possible. In a preferred embodiment, the swing on the connector is approximately 15 degrees.

The above-described embodiments of the present invention are meant to be illustrative of preferred embodiments and are not intended to limit the scope of the present invention. Various modifications, which would be readily apparent to one skilled in the art, are intended to be within the scope of the present invention. The only limitations to the scope of the present invention are set forth in the following claims appended hereto.

What is claimed is:

- [1. A movable reconfigurable wall system comprising:
  - a) at least one wall module having a front and rear surface and top, bottom, right side and left side edges, said at least one wall module having:
    - i) a vertical end frame disposed adjacent to each of said right and left side edges, each vertical end frame having a first vertically extending flange and a spaced apart second vertically extending flange thereon, each of said first vertically extending flange and said second vertically extending flange having a beaded portion, the beaded portion on one of said first vertically extending flange or said second vertically extending flange extending toward the front surface of the wall module and the beaded portion on the other of said first vertically extending flange or said second vertically extending flange extending toward the rear surface of the wall module;
    - ii) a plurality of horizontal stringers affixed between said vertical end frames at said right and left side edges; and
    - iii) an aesthetic surface affixed to said stringers; and
  - b) a removable connecting strip having a pair of spaced apart flexible arms, each arm having a beaded portion thereon, the beaded portion of one of said arms being adapted to connect releasably to the beaded portion of one of said first vertically extending flange or said second vertically extending flange on said vertical end frame and the beaded portion of the other of said arms being adapted to connect releasably to the beaded portion of a corresponding opposed vertically extending flange on a separate vertical end frame of a second wall module, a wall bracket, a finishing trim or a connection post to hold one of said first vertically extending flange or said second vertically extending flange and said opposed vertically extending flange together, the beaded portions of said first vertically extending flange or said second vertically extending flange and said opposed vertically extending flange fitting inside the arms of said connecting strip to hold said first vertically extending flange or said second vertically extending flange and said opposed vertically extending flange together thereby releasably connect-

## 11

ing said at least one wall module to the other of said second wall module, wall bracket, finishing trim or connection post.]

[2. The movable reconfigurable wall system of claim 1, wherein said connecting strip includes a spine adapted to fit between said first vertically extending flange or said second vertically extending flange and said opposed vertically extending flange.]

[3. The movable reconfigurable wall system of claim 2, wherein said connecting strip further includes a pair of flexible fin extensions extending opposite to said flexible arms for providing a seal.]

[4. The movable reconfigurable wall system of claim 1, wherein said aesthetic surface includes a tile panel on said front surface, said rear surface, or both said front surface and said rear surface.]

[5. The movable reconfigurable wall system of claim 4, wherein each said stringer includes one or more protrusions, said reconfigurable wall system further including tile clips for affixing tiles to said one or more protrusions.]

[6. The movable reconfigurable wall system of claim 1, wherein said aesthetic surface is a single divider selected from a group consisting of substrates consisting of glass, plastic, or wood and metal.]

[7. The movable reconfigurable wall system of claim 6, wherein said stringers and end frames include a channel for receiving said divider.]

[8. The movable reconfigurable wall system of claim 1, wherein said stringers include a cantilever channel stringer, said cantilever channel stringer having: a central horizontally extending channel portion with a generally L-shaped slot, said L-shaped slot adapted to receive and engage a substantially L-shaped hook formed on a wall accessory; an upper portion having a tile support; a lower portion having a tile support; and a pair of extending webs connecting said channel portion to said upper and a lower portion.]

[9. The movable reconfigurable wall system of claim 1, wherein said system further comprises an extension frame, said extension frame including a pair of vertical extension end frames and at least one stringer, said extension frame being affixed atop of said at least one module with a spline on each end of said end frame.]

[10. The movable reconfigurable wall system of claim 1, wherein said aesthetic surface includes a slat wall, said slat wall having slats and slat wall channels for connection to slat wall accessories.]

[11. The movable reconfigurable wall system of claim 1, said system further comprising a levelling system having: a universal foot; a leveller capable of engaging said universal foot; and a structural extrusion to engage surface of said at least one module, said structural extrusion connecting to said leveller, wherein said leveller provides the sole connection between said universal foot and said module.]

[12. The movable reconfigurable wall system of claim 11, wherein said leveller comprises: a cylindrical internally threaded upper section; an internally and externally threaded middle section, said external threads matching said internally threaded upper section; and an externally threaded lower section, said externally threaded lower section matching internal threads of said middle section, wherein said middle section can be twisted to extend or contract said leveller.]

[13. The movable reconfigurable wall unit of claim 11 further comprising a base trim, said base trim attaching to said universal foot.]

[14. The movable reconfigurable wall unit of claim 1 further comprising a ceiling connection, said ceiling con-

## 12

nection including: a ceiling track affixed to a ceiling; a horizontal upper section affixed to said module, said horizontal upper section adapted to fit about said ceiling track; a flexible gasket affixed to said horizontal upper section and extending above said horizontal upper section to contact the ceiling.]

[15. The movable reconfigurable wall unit of claim 1, wherein said wall bracket comprises:

an extrusion for connection to an existing wall in alignment with said end frame; and

first and second flanges on said extrusion corresponding to said first vertically extending flange and said second vertically extending flange on said end frame and arranged in opposition thereto.]

[16. The movable reconfigurable wall unit of claim 1 further comprising a wall joint, said wall joint comprising a flexible gasket and a channel, said channel adapted to connect to a flange of said at least one module.]

[17. The movable reconfigurable wall unit of claim 1, wherein said at least one module includes curved stringers and curved aesthetic surfaces.]

[18. The movable reconfigurable wall unit of claim 1, wherein said connection post includes at least two sides having vertically extending flanges thereon corresponding to and arranged in opposition to said first and second flanges on said end frame.]

[19. The movable reconfigurable wall unit of claim 1, wherein said aesthetic surface includes a multimedia component.]

[20. The movable reconfigurable wall unit of claim 19, wherein said multimedia component is a video monitor.]

[21. The movable reconfigurable wall unit of claim 1, wherein said vertical end frame depth is extended to provide a deeper wall.]

[22. The movable reconfigurable wall unit of claim 21, wherein said deeper wall is adapted to accommodate a rear-projection video system.]

[23. The movable reconfigurable wall unit of claim 21, wherein said deeper wall is adapted to accommodate an integrated storage system.]

[24. The movable reconfigurable wall unit of claim 1, further comprising a wall mounted module for mounting to an existing wall face, said wall mounted module having:

- a) vertical end brackets disposed at least at its side edges, each said vertical end frame having a vertically extending flange directed away from said existing wall face;
- b) a plurality of horizontal stringers affixed between said pair of vertical end brackets; and
- c) an aesthetic surface affixed to said stringers.]

[25. The movable reconfigurable wall unit of claim 1, further comprising a furniture system connectable to said at least one module, the furniture system having: a work surface, said work surface connectable to said stringers; and furniture legs, said furniture legs connecting to said work surface at a first end and connecting to a threaded bolt at a second end opposite said first end, said threaded bolt allowing levelling of said work surface.]

26. *A movable reconfigurable wall module having one or more tiles mounted thereto, and sufficient depth so that a multimedia component is mounted flush with at least one of the one or more tiles and enclosed within the wall module, the movable reconfigurable wall module comprising:*

- a first vertical end frame, the first vertical end frame having a height, and further having a depth defined by a distance between a front side and a back side of the first vertical end frame;*



13

a second vertical end frame, the second vertical end frame having a depth that is defined by a distance between a front side and a back side of the second vertical end frame, the depth being at least as large as the depth of the first vertical end frame;

a plurality of horizontal frame stringers that interconnect the first and second vertical end frames;

a plurality of tiles snap-fit mounted to the horizontal frame stringers so as to provide at least a portion of a surface to the wall module; and

a multimedia center suspended between the first and second vertical frames and adjacent to the one or more tiles;

wherein:

an outward-most facing surface of the multimedia center is co-planar with outward-most facing surfaces of the one or more tiles;

at least one of the horizontal stringers in the plurality comprises a first receiving feature for receiving one or more wall accessories;

the first receiving feature is accessible from outside of the first or second affixed tiles;

the first receiving feature comprises a first edge that aligns with an edge of the first tile and a second edge that aligns with an edge of the second tile.

27. The movable reconfigurable wall module as recited in claim 26, wherein:

at least one of the tiles is mounted between the first and second vertical frames; and

at least one of the tiles is mounted so as to span horizontally across one or both of the first or second vertical frames.

28. The movable reconfigurable wall module as recited in claim 26, wherein the multimedia center comprises a display screen.

29. The movable reconfigurable wall module as recited in claim 28, wherein the display screen is within the same plane as the one or more tiles.

30. The movable reconfigurable wall module as recited in claim 28, wherein the multimedia center also comprises one or more speakers.

31. The movable reconfigurable wall module as recited in claim 28, wherein at least one of the tiles comprises one or more integrated storage spaces.

32. The movable reconfigurable wall module as recited in claim 26, wherein the multimedia center comprises a digital whiteboard.

33. The movable reconfigurable wall module as recited in claim 26, wherein the multimedia center is suspended adjacent to one or more of the tiles without any intervening tile surface between the multimedia center and each of the one or more tiles.

34. A movable reconfigurable wall module comprising:

a first wall module having a first vertical end frame disposed adjacent a left edge of the first wall module and a second vertical end frame disposed adjacent a right edge of the first wall module;

a first plurality of horizontal stringers interconnecting the first vertical end frame of the first wall module and the second vertical end frame of the first wall module;

a first tile affixed through a snap-fit connection to one or more of the first plurality of horizontal stringers and at least a second tile affixed through a snap-fit connection to a horizontal stringer of the first wall module or a second, adjacent wall module; and

14

a first media panel physically integrated within the first wall module between the first vertical end frame and the second vertical end frame, and adjacent to both the first and second tiles;

wherein:

a front face of the first media panel is coplanar with both of the first and second tiles;

the front face of the first media panel extends at least from the first vertical end frame of the first wall module to the second vertical end frame of the first wall module, and thereby spans the first and second vertical end frame without any intervening surfaces between the first media panel and the first and second vertical end frames;

at least one of the horizontal stringers in the plurality comprises a first receiving feature for receiving one or more wall accessories;

the first receiving feature is accessible from outside of the first or second affixed tiles; and

the first receiving feature comprises a first edge that aligns with an edge of the first tile and a second edge that aligns with an edge of the second tile.

35. The movable reconfigurable wall module as recited in claim 34, further comprising:

a connecting flange for connecting the first wall module to an adjacent second wall module.

36. The movable reconfigurable wall module as recited in claim 34, wherein:

the first plurality of horizontal stringers comprises an intermediate stringer that is positioned below an upper stringer and above a lower stringer; and

at least the first tile is affixed to the intermediate stringer through a snap-fit connection.

37. The movable reconfigurable wall module as recited in claim 34, wherein the first media panel comprises a display screen.

38. The movable reconfigurable wall module as recited in claim 34, wherein the first media panel comprises a rear projector.

39. The movable reconfigurable wall module as recited in claim 34, wherein the first media panel comprises a digital whiteboard.

40. The movable reconfigurable wall module as recited in claim 34, wherein at least one of the first plurality of horizontal stringers comprises a multi-media channel configured to support mounting hardware for audio-video equipment mounted within the first wall module.

41. The movable reconfigurable wall module as recited in claim 34, wherein the media panel is suspended adjacent each of the first and second tiles without any intervening tile surface between the multimedia center and the first or second tiles.

42. The movable reconfigurable wall module as recited in claim 34, wherein:

at least one of the tiles is mounted between the first and second vertical frames; and

at least one of the tiles is mounted so as to span horizontally across one or both of the first or second vertical frames.

43. The movable reconfigurable wall module as recited in claim 34, wherein the first media panel comprises a display screen.

44. The movable reconfigurable wall module as recited in claim 43, wherein the display screen is within the same plane as the one or more tiles.

## 15

45. The movable reconfigurable wall module as recited in claim 43, wherein the first media panel also comprises one or more speakers.

46. The movable reconfigurable wall module as recited in claim 43, wherein at least one of the tiles comprises one or more integrated storage spaces.

47. A movable reconfigurable wall module comprising:  
 a first wall module having a first vertical end frame disposed adjacent a left edge of the first wall module and a second vertical end frame disposed adjacent a right edge of the first wall module;  
 a first plurality of horizontal stringers interconnecting the first vertical end frame of the first wall module and the second vertical end frame of the first wall module;  
 at least one of the first plurality of horizontal stringers comprising a first receiving feature for receiving one or more wall accessories;  
 a plurality of tiles affixed to one or more of the first plurality of horizontal stringers, wherein:  
 the first receiving feature is accessible from outside of the affixed tile; and  
 a first media panel physically integrated within the first wall module wall, wherein an outward-most facing surface of the multimedia center is co-planar with outward-most facing surfaces of the tiles;  
 at least one of the horizontal stringers in the first plurality comprises a first receiving feature for receiving one or more wall accessories;  
 the first receiving feature is accessible from outside of the first or second affixed tiles;  
 the first receiving feature comprises a first edge that aligns with an edge of the first tile and a second edge that aligns with an edge of a second tile.

48. The movable reconfigurable wall module as recited in claim 47, further comprising:  
 a connecting flange for connecting the first wall module to an adjacent second wall module.

## 16

49. The movable reconfigurable wall module as recited in claim 47, wherein the tile is affixed to the one or more of the first plurality of horizontal stringers through a snap-fit connection.

50. The movable reconfigurable wall module as recited in claim 49, wherein:

the first plurality of horizontal stringers comprises an intermediate stringer that is positioned below an upper stringer and above a lower stringer; and  
 the tile is affixed to the intermediate stringer through a snap-fit connection.

51. The movable reconfigurable wall module as recited in claim 47, wherein the media panel is suspended adjacent each of first and second tiles without any intervening tile surface between the multimedia center and the first or second tiles.

52. The movable reconfigurable wall module as recited in claim 47, wherein:

at least one of the tiles is mounted between the first and second vertical frames; and  
 at least one of the tiles is mounted so as to span horizontally across one or both of the first or second vertical frames.

53. The movable reconfigurable wall module as recited in claim 47, wherein the first media panel comprises a display screen.

54. The movable reconfigurable wall module as recited in claim 53, wherein the display screen is within the same plane as the plurality of tiles.

55. The movable reconfigurable wall module as recited in claim 53, wherein the first media panel also comprises one or more speakers.

56. The movable reconfigurable wall module as recited in claim 53, wherein at least one of the tiles comprises one or more integrated storage spaces.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : RE46,929 E  
APPLICATION NO. : 14/681874  
DATED : July 3, 2018  
INVENTOR(S) : Gosling et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

Column 15

Line 21, change “affixed tile; and” to --affixed tiles;--

Line 22, change “a first media panel physically” to --a first media panel is physically--

Line 24, change “the multimedia center is co-planar” to --the media panel is co-planar--

Line 25, change “of the tiles;” to --of the tiles; and--

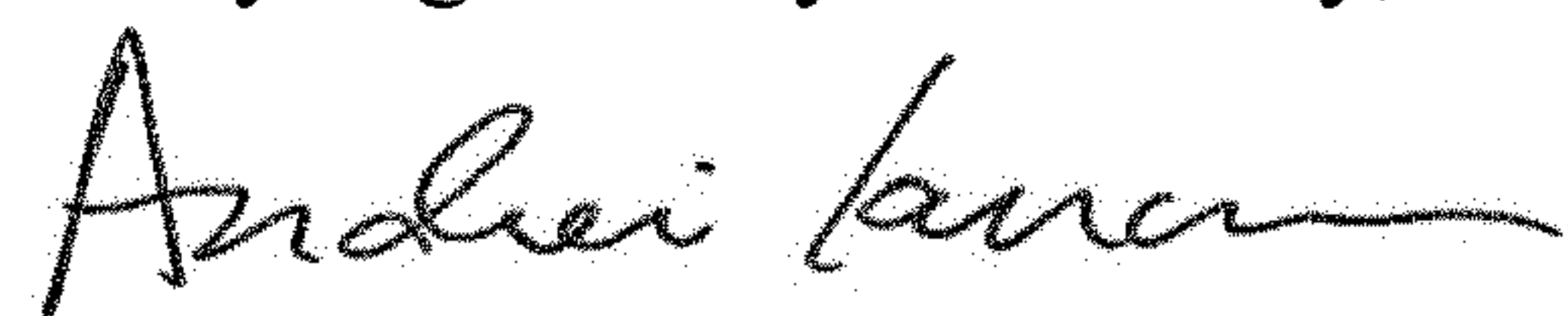
Lines 26-28, remove “at least one of the horizontal stringers in the first plurality comprises a first receiving feature for receiving one or more wall accessories;”

Lines 29-30, remove “the first receiving feature is accessible from outside of the first or second affixed tiles;”

Column 16

Line 16, change “the multimedia center and the first” to --the media panel and the first--

Signed and Sealed this  
Twenty-eighth Day of January, 2020



Andrei Iancu  
*Director of the United States Patent and Trademark Office*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : RE46,929 E  
APPLICATION NO. : 14/681874  
DATED : July 3, 2018  
INVENTOR(S) : Gosling et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Specification

Under the heading "CROSS-REFERENCE TO RELATED APPLICATIONS," please replace the paragraph at Lines 15-32 (approx.), with the following:

*NOTICE: More than one reissue application has been filed for the reissue of U.S.*

*Patent No. 8,024,901 B2. The reissue applications are U.S. Reissue Patent Application Serial No. 15/074,383, filed on March 18, 2016, now U.S. Reissue Patent No. RE47,693 E, issued November 5, 2019, U.S. Reissue Patent Application Serial No. 14/681,874 (the present application), filed on April 8, 2015, now U.S. Reissue Patent No. RE46,929 E, issued July 3, 2018, U.S. Reissue Patent Application Serial No. 14/305,819, filed on June 16, 2014, now U.S. Reissue Patent No. RE47,132 E, issued November 20, 2018, which are a continuation reissue application, a divisional reissue application, a continuation reissue application, respectively, of U.S. Reissue Patent Application Serial No. 14/032,931, filed on September 20, 2013, now abandoned, which is a reissue application of U.S. Patent Application Serial No. 11/205,314, filed on August 17, 2005, now U.S. Patent No. 8,024,901 B2, issued on September 27, 2011, which claims the benefit of the filing date of U.S. Provisional Patent Application Serial No. 60/601,985, entitled "INTEGRATED RECONFIGURABLE WALL SYSTEM," filed August 17, 2004, now expired.*

Signed and Sealed this  
Twenty-third Day of March, 2021



Drew Hirshfeld  
Performing the Functions and Duties of the  
Under Secretary of Commerce for Intellectual Property and  
Director of the United States Patent and Trademark Office