

US00RE47132E

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

(10) **Patent Number:** **US RE47,132 E**
(45) **Date of Reissued Patent:** ***Nov. 20, 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)

(*) Notice: This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/305,819**

(22) Filed: **Jun. 16, 2014**

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:

(63) Continuation 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**
USPC 52/239, 238.1, 479, 481.1, 481.2
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

European Search Report, EP 12800672, dated Oct. 10, 2014.
(Continued)

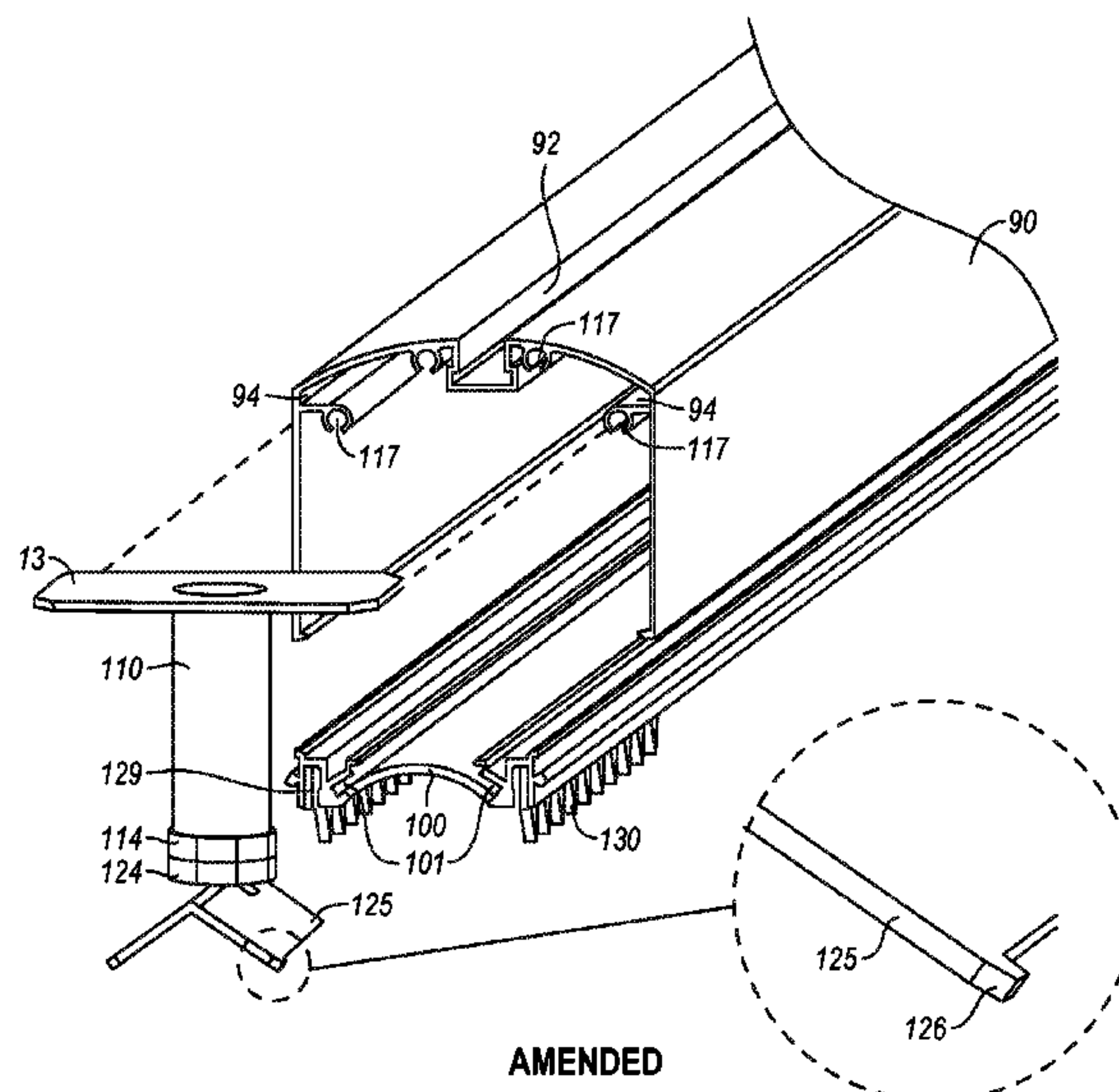
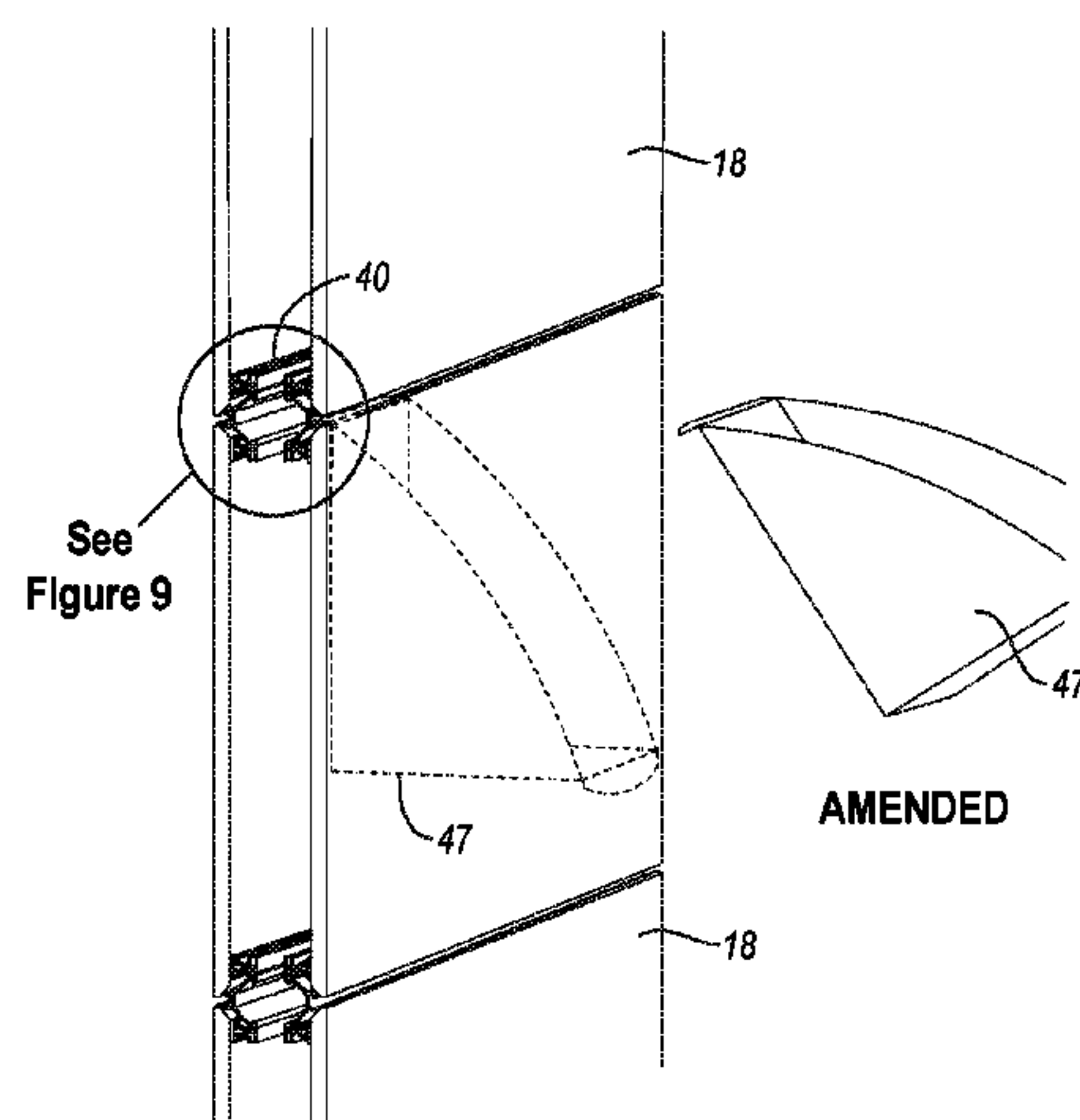
Primary Examiner — Jeffrey L Gellner

(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.

35 Claims, 22 Drawing Sheets



US RE47,132 E

Page 2

Related U.S. Application Data		5,600,926 A *	2/1997	Ehrlich	52/239
(60)	Provisional application No. 60/601,985, filed on Aug. 17, 2004.	5,601,348 A	2/1997	Minkovski	
		5,642,593 A	7/1997	Shieh	
		5,669,314 A	9/1997	Grant	
		5,740,644 A	4/1998	Menchetti	
(52)	U.S. Cl. CPC E04B 2002/7462 (2013.01); E04B 2002/7483 (2013.01)	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	
(56)	References Cited U.S. PATENT DOCUMENTS	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	
		5,931,429 A *	8/1999	Hellwig	A47B 5/06 108/108
		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 et al.	52/36.6
		6,393,782 B1	5/2002	Berrdige	
		6,393,783 B2	5/2002	Emaus	
		6,397,533 B1 *	6/2002	Hornberger	A47B 95/008 52/238.1
		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	
		2,676,481 A	4/1954	Hoffman	
		3,037,593 A	6/1962	Webster	
		3,088,127 A	5/1963	Charles	
		3,180,457 A	4/1965	Bohnsack	
		3,521,937 A	7/1970	Buhrmaster	
		3,602,226 A	9/1971	Ericson	
		3,621,635 A	11/1971	Lange	
		3,675,382 A *	7/1972	Licklitter	E06B 1/18 52/204.595
		3,696,569 A	10/1972	Didry	
		3,885,361 A	5/1975	De Schutter	
		4,027,878 A	6/1977	Dadbeh	
		4,103,373 A	8/1978	Luedtke	
		4,128,983 A	12/1978	Matsubara	
		4,277,920 A	7/1981	Dixon	
		4,438,614 A	3/1984	Raith	
		4,449,337 A	5/1984	Gzym	
		4,493,172 A	1/1985	Jones	
		4,535,577 A	8/1985	Tenser	
		4,631,881 A	12/1986	Charman	
		4,688,491 A	8/1987	Herrera	
		4,752,101 A	6/1988	Yurchenco	
		4,757,657 A	7/1988	Mitchell	
		D302,497 S	8/1989	Zapf	
		D309,381 S	7/1990	Buhk	
		D309,382 S	7/1990	Randall	
		D309,384 S	7/1990	Buhk	
		D309,385 S	7/1990	Buhk	
		D309,386 S	7/1990	Buhk	
		4,991,365 A	2/1991	Jackson	
		5,038,539 A	8/1991	Kelley	
		5,056,285 A	10/1991	Frascaroli	
		D321,801 S	11/1991	Friedman	
		5,064,247 A	11/1991	Clark	
		D323,251 S	1/1992	Zapf	
		5,086,597 A	2/1992	Kelley	
		D325,309 S	4/1992	Worrell	
		5,117,599 A	6/1992	Voss	
		D327,794 S	7/1992	Zapf	
		D328,680 S	8/1992	Zapf	
		5,144,777 A	9/1992	Fishel	
		D330,295 S	10/1992	Zapf	
		5,155,955 A	10/1992	Ball	
		D330,641 S	11/1992	Zapf	
		D330,643 S	11/1992	Zapf	
		5,159,793 A	11/1992	Deugo	
		D331,335 S	12/1992	Zapf	
		D331,513 S	12/1992	Zapf	
		5,171,060 A	12/1992	Kaye	
		5,172,530 A	12/1992	Fishel	
		5,184,441 A	2/1993	Balfanz	
		5,204,149 A	4/1993	Phenicie	
		5,207,037 A	5/1993	Giles	
		5,218,799 A	6/1993	Appino	
		D337,003 S	7/1993	Rowland	
		5,227,005 A	7/1993	Zodrow et al.	
		5,321,579 A	6/1994	Brown	
		D348,786 S	7/1994	Tolleson	
		5,351,452 A	10/1994	Gates	
		5,352,033 A	10/1994	Gresham	
		5,394,668 A	3/1995	Lim	
		5,488,808 A	2/1996	Cahill	
		D371,683 S	7/1996	Tolleson	
		5,544,593 A	8/1996	Canfield	
		5,592,794 A	1/1997	Tundaun	

US RE47,132 E

Page 3

(56)

References Cited

U.S. PATENT DOCUMENTS

6,851,226	B2	2/2005	MacGregor	
6,865,853	B2	3/2005	Burken	
6,883,277	B2	4/2005	Wiechecki	
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	Batthey	
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	
2003/0060080	A1	3/2003	Rees	
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	Batthey 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	0443202	8/1991
EP	0557092	1/1998
EP	0963719	12/1999
EP	1094167	4/2001
FR	1526637	5/1968
GB	2221946	2/1990
GB	2283071	4/1995
GB	2353541	10/2003
JP	HO3 17333	1/1991

(56)

References Cited

FOREIGN PATENT DOCUMENTS

JP	2003105908	4/2003
JP	2005155223	6/2005
KR	1020000049102	7/2000
KR	1020070077502	7/2007
WO	GB1259347	1/1972
WO	GB1400613	7/1975
WO	EP0302564	2/1989
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	EP0557092	1/1998
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	WO03104581	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

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

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.

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.

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.

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.

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.

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.

Decision Denying Institution (IPR2015-01690), *Allsteel v. DIRT Environmental Solution* dated Jan. 27, 2016.

Decision Granting Institution (IPR2015-01691), *Allsteel v. DIRT Environmental Solutions* dated Feb. 2, 2016.

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.

Notice of Allowance for U.S. Appl. No. 14/657,837 dated Apr. 12, 2016.

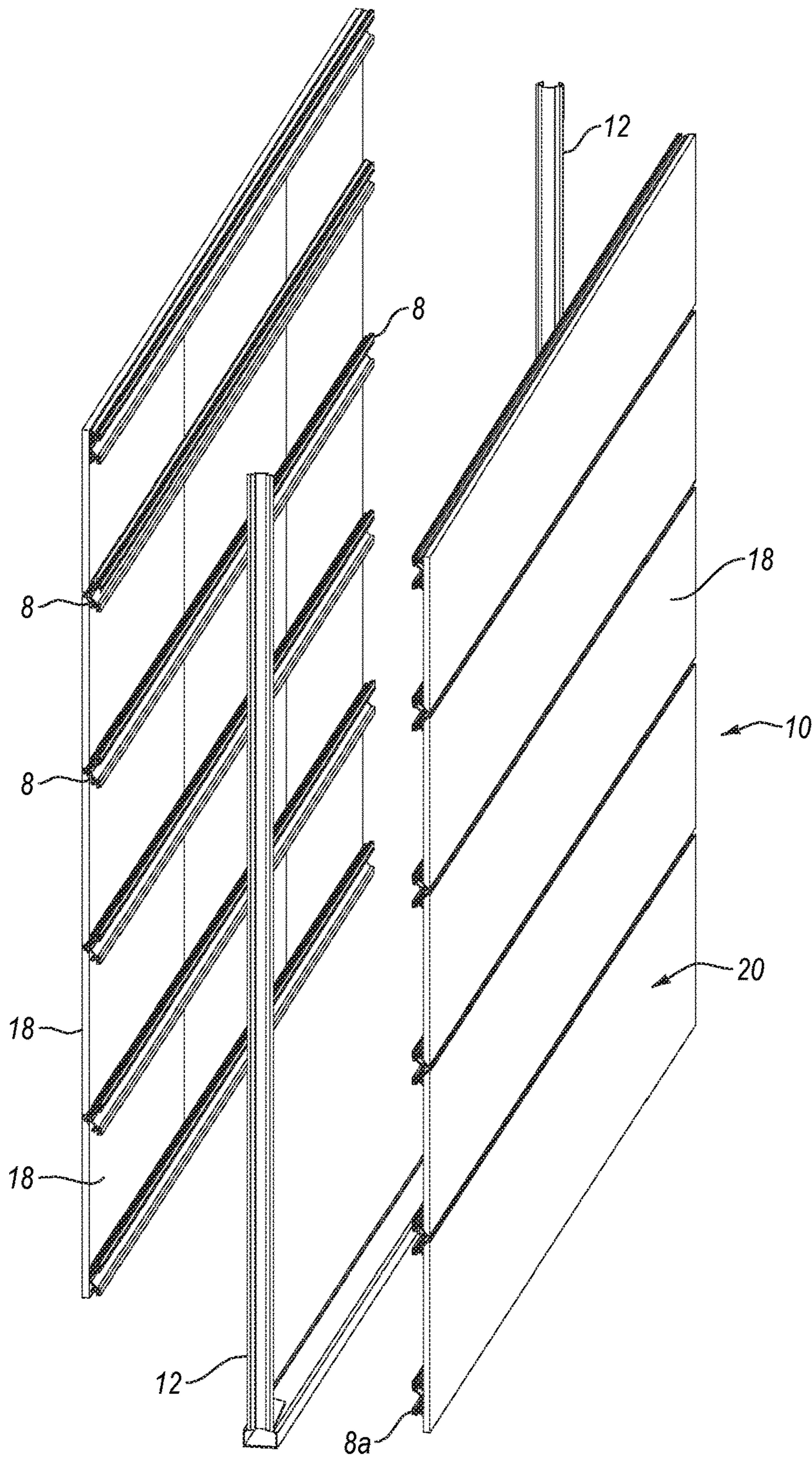
Final Written Decision (IPR2015-01691), *Allsteel v. DIRT Environmental Solutions* dated Jan. 19, 2017.

Non-Final Office Action for U.S. Appl. No. 14/681,874 dated Jun. 15, 2016.

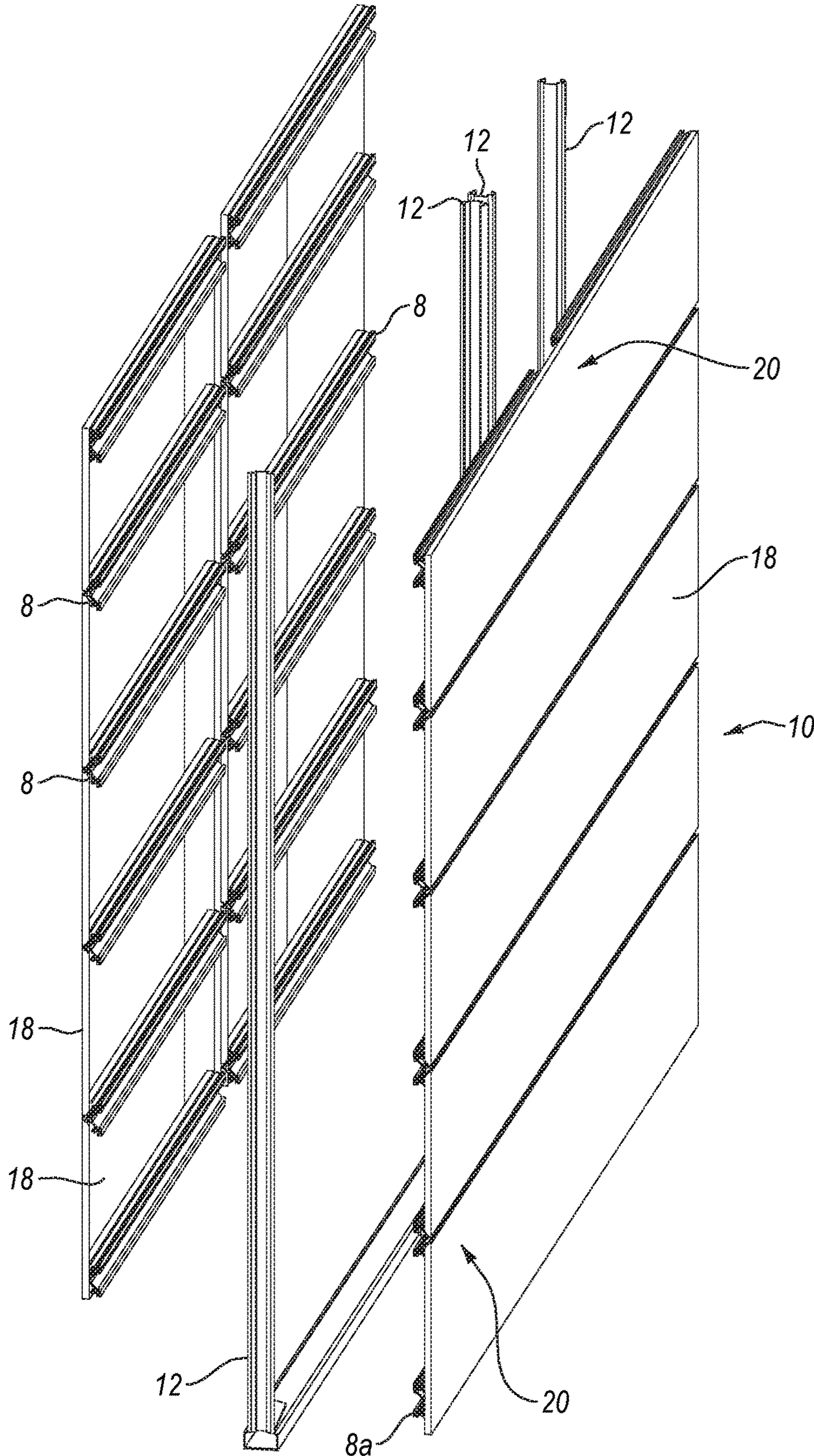
Office Action for U.S. Appl. No. 14/032,931 dated Jul. 16, 2015.

Restriction Requirement for U.S. Appl. No. 14/683,684 dated Oct. 5, 2017.

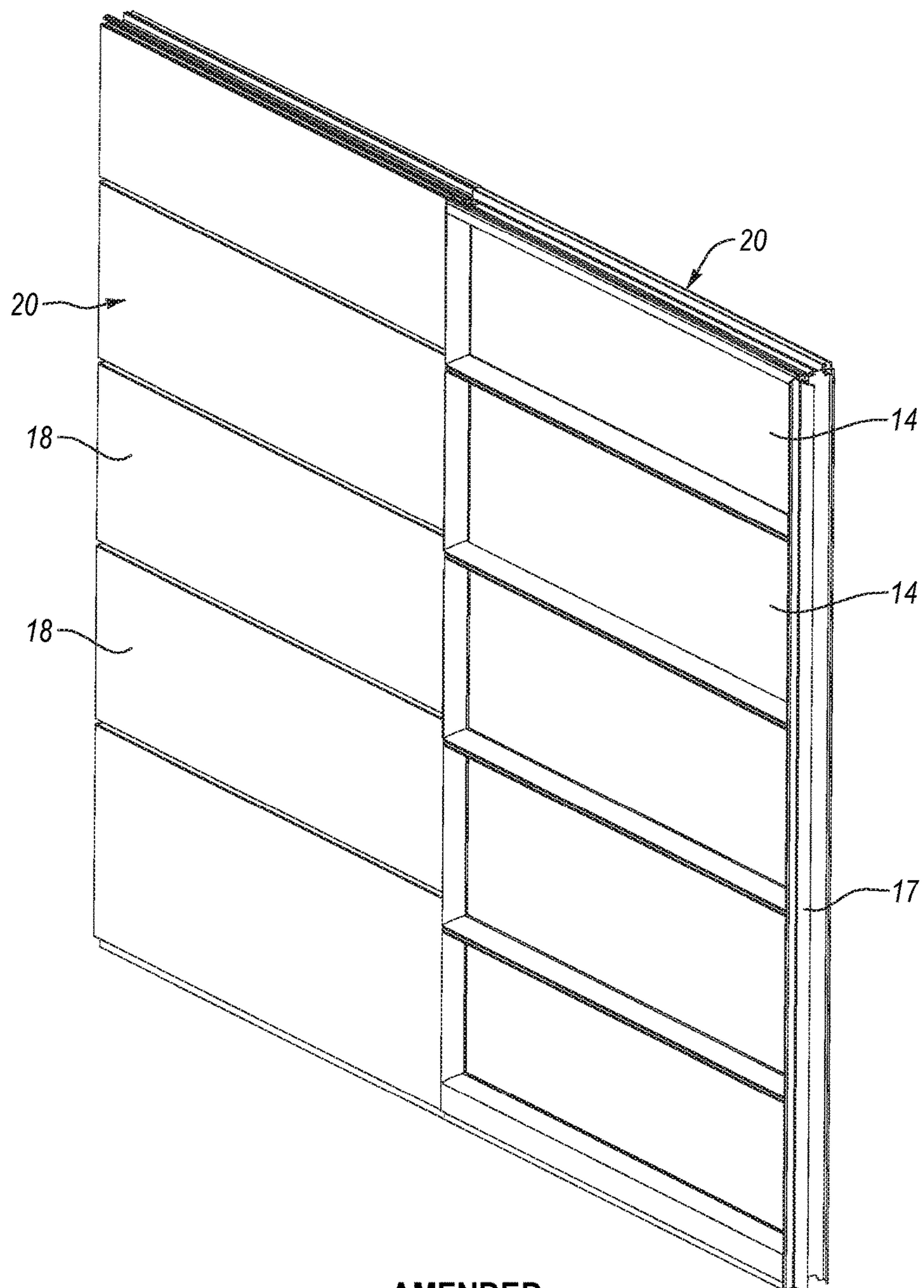
* cited by examiner



AMENDED
Figure 1



- NEW -
Figure 1A



AMENDED
Figure 2

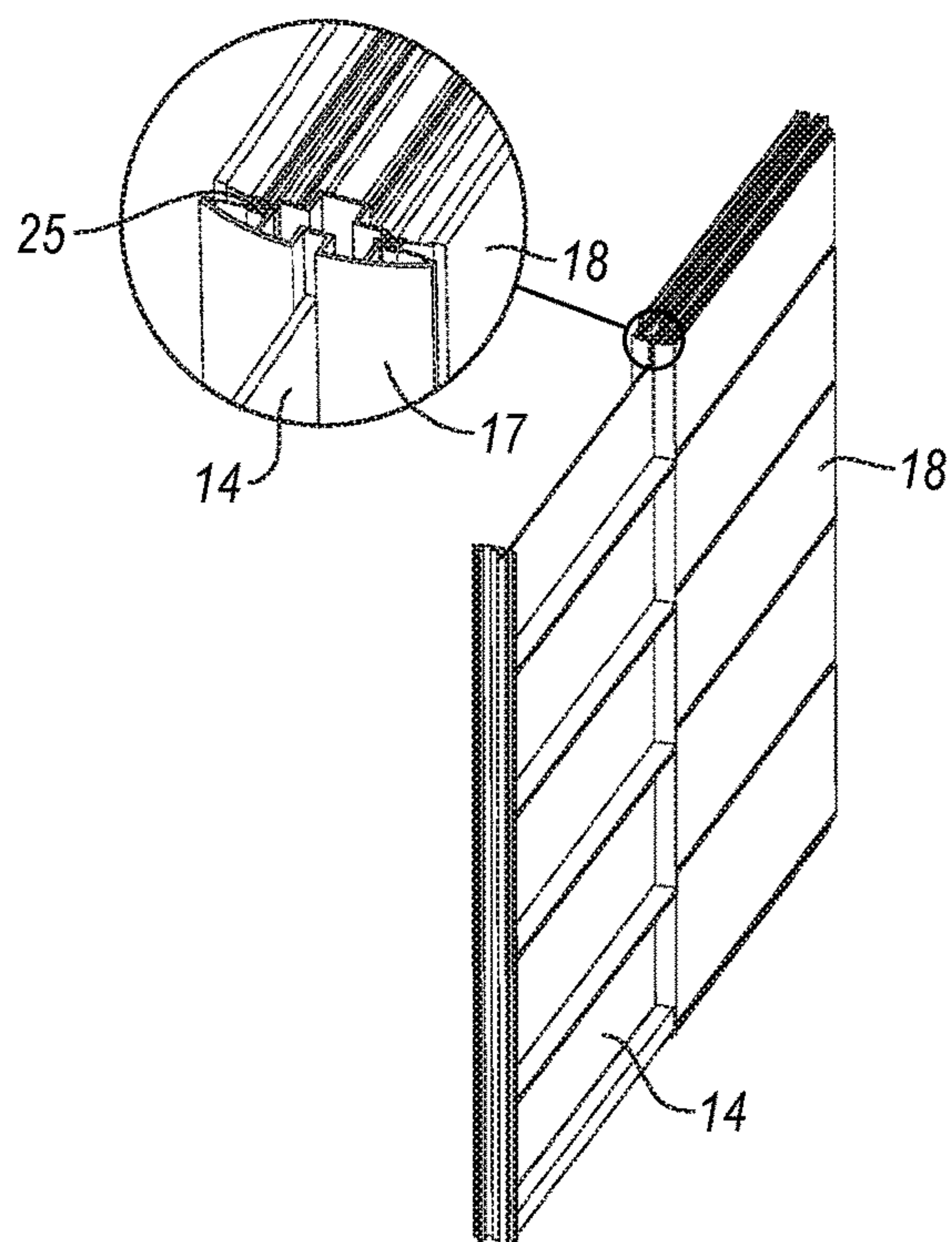
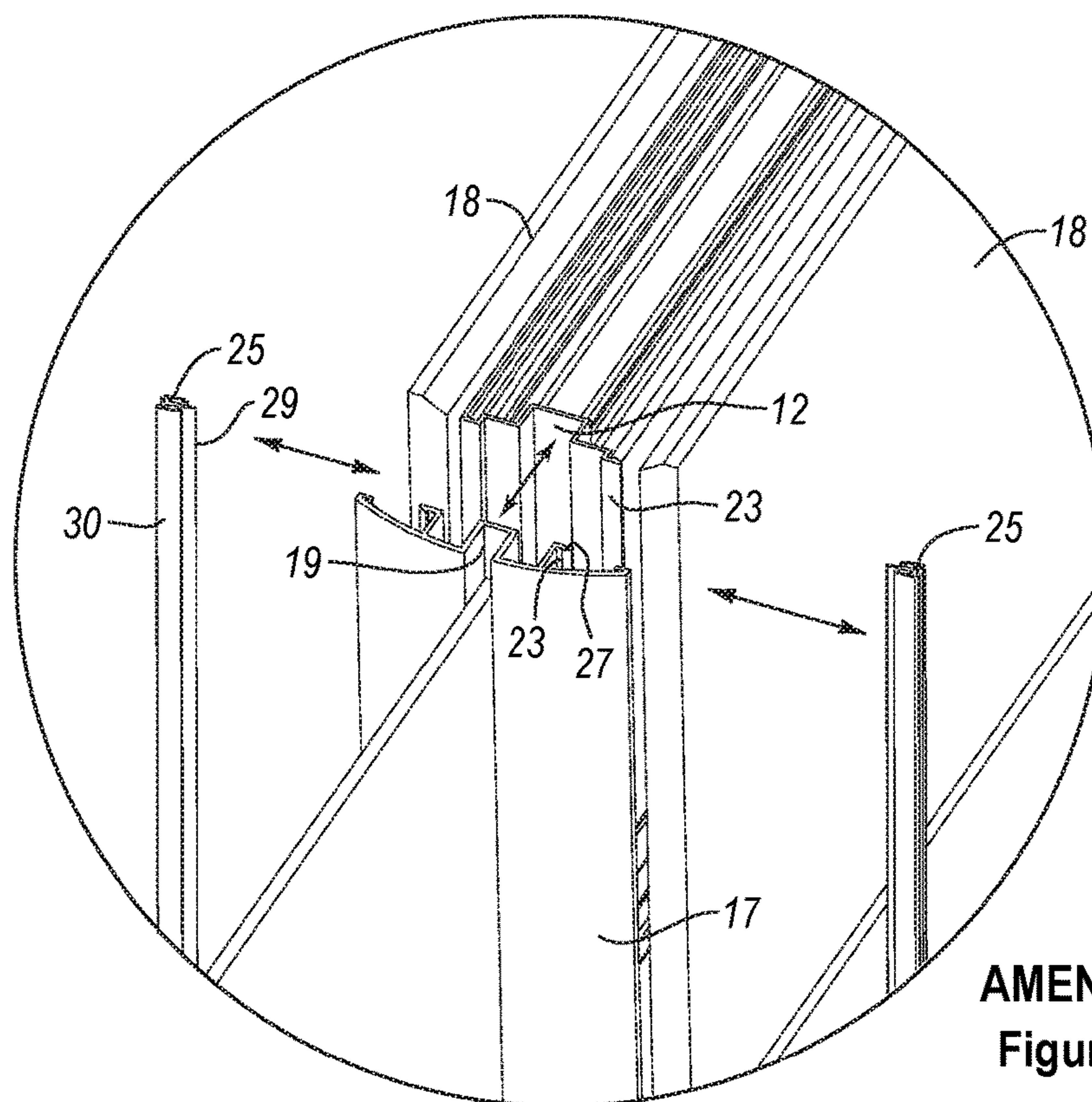


Figure 3



AMENDED
Figure 4

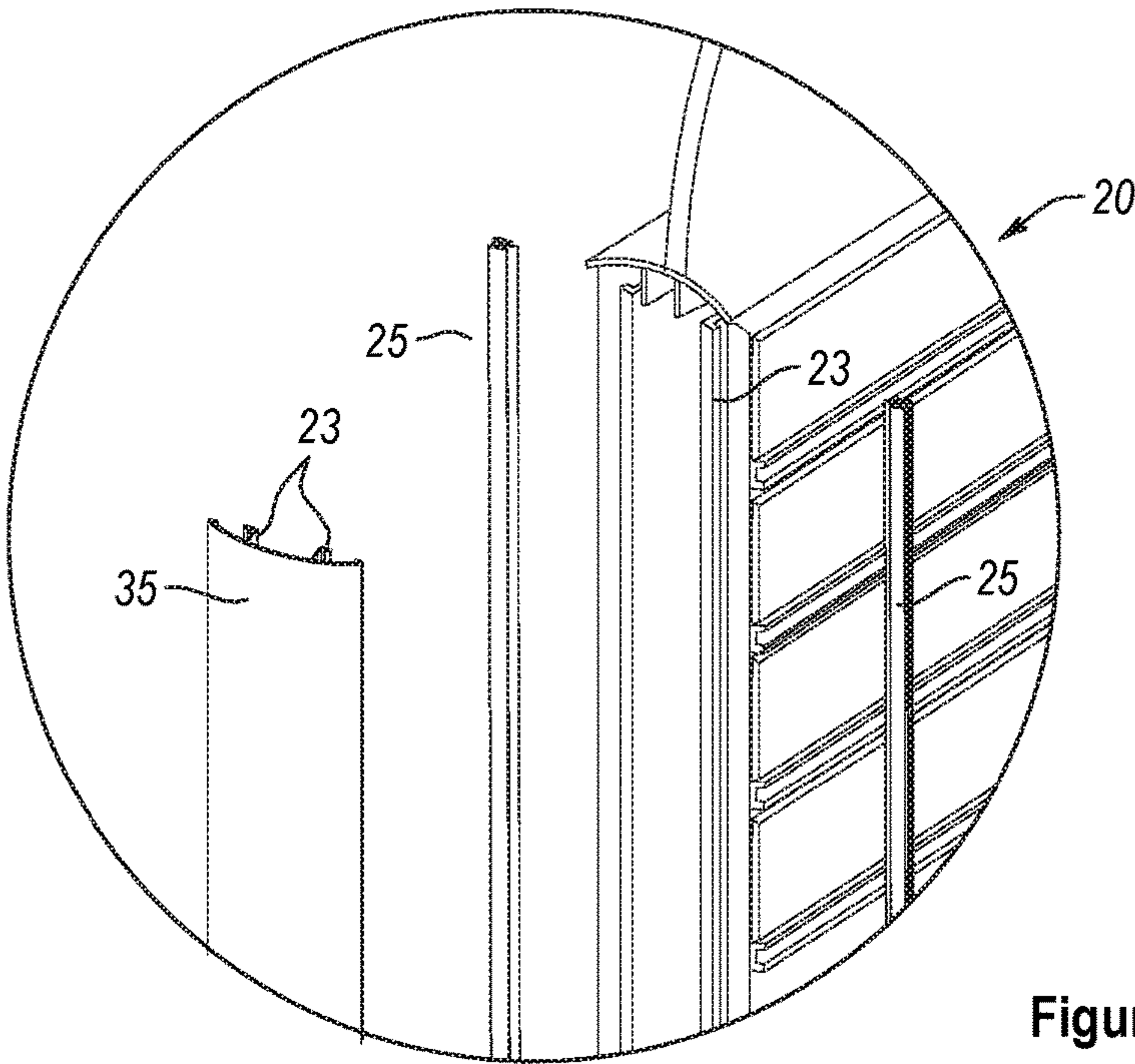
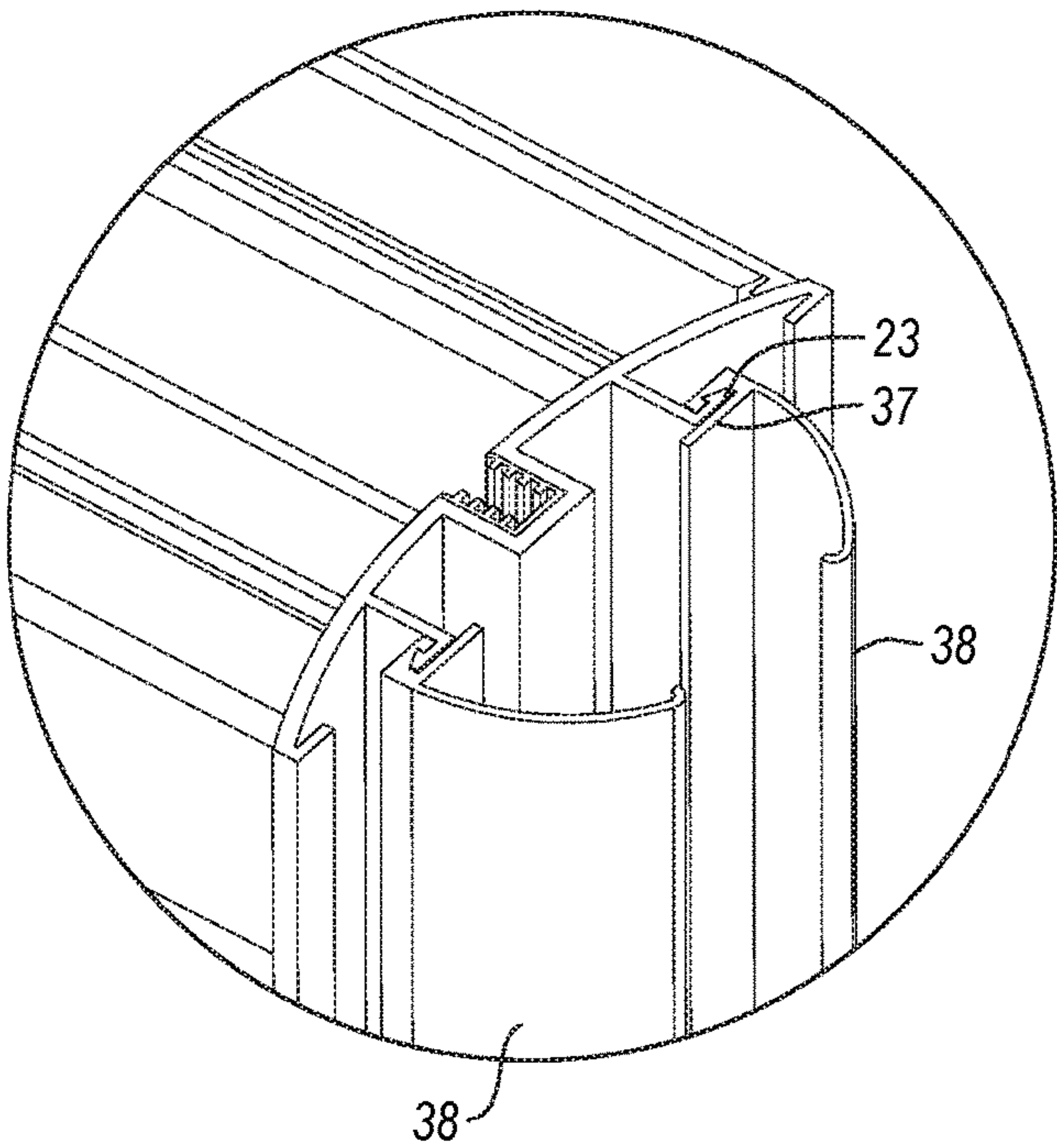
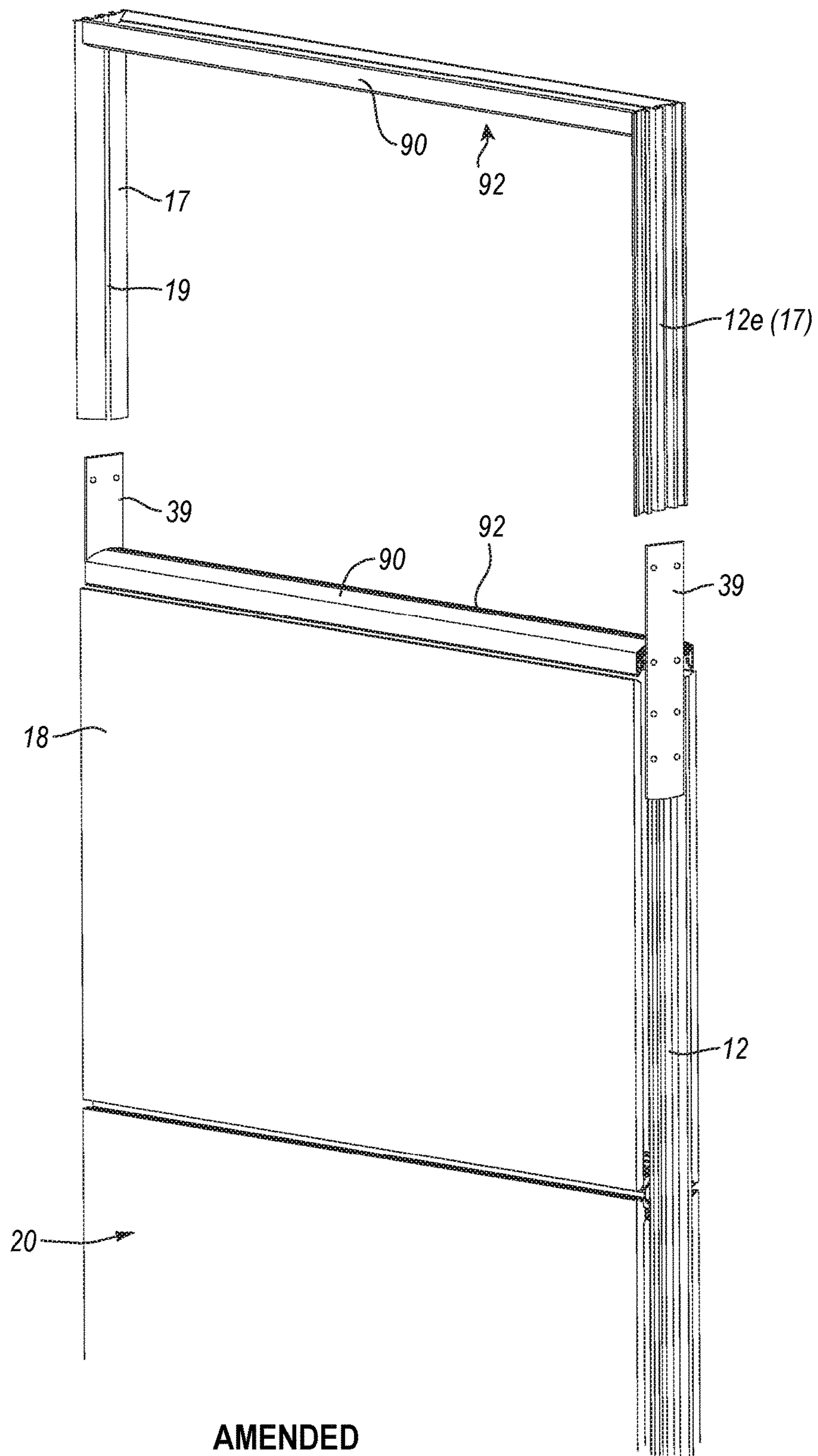


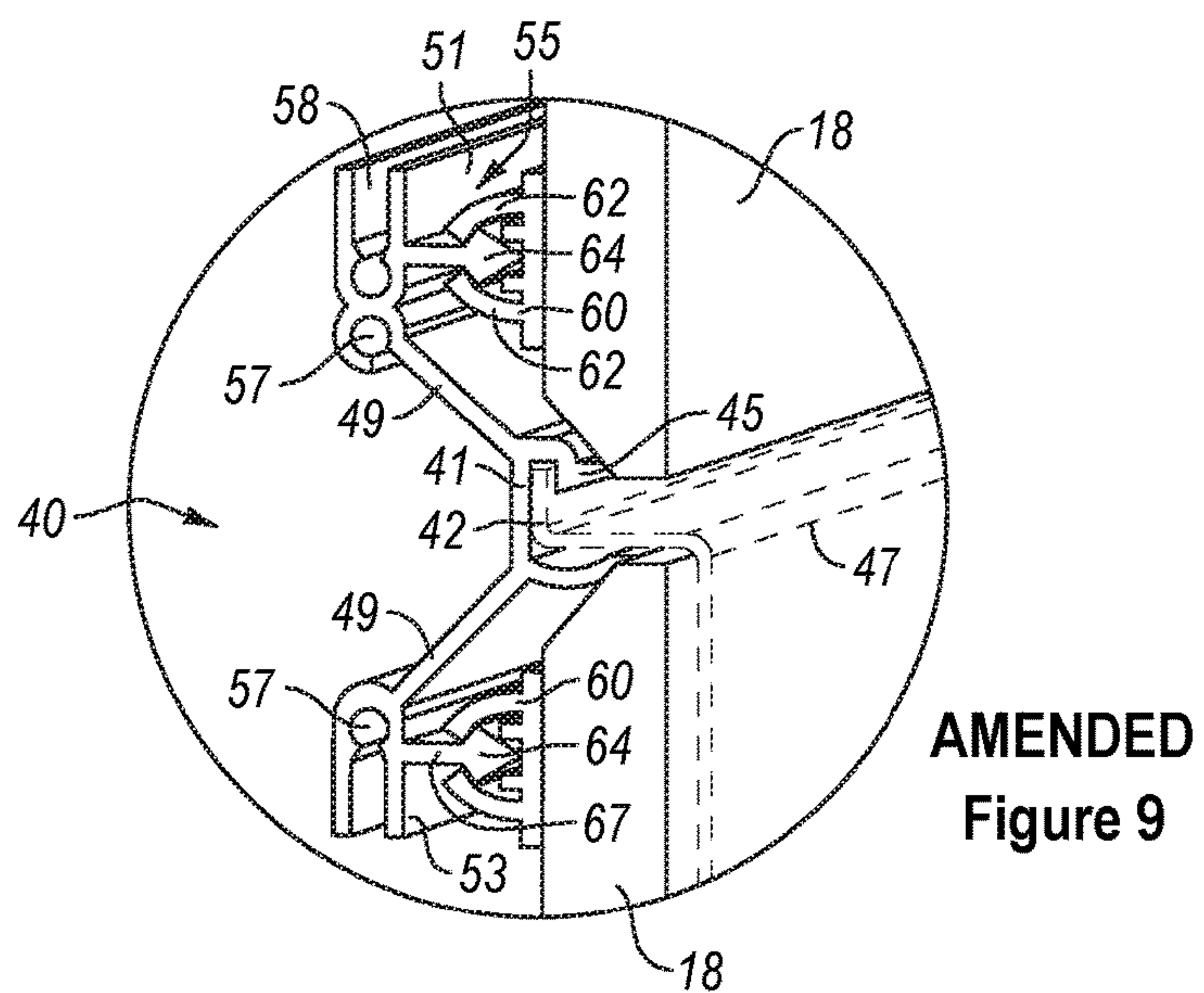
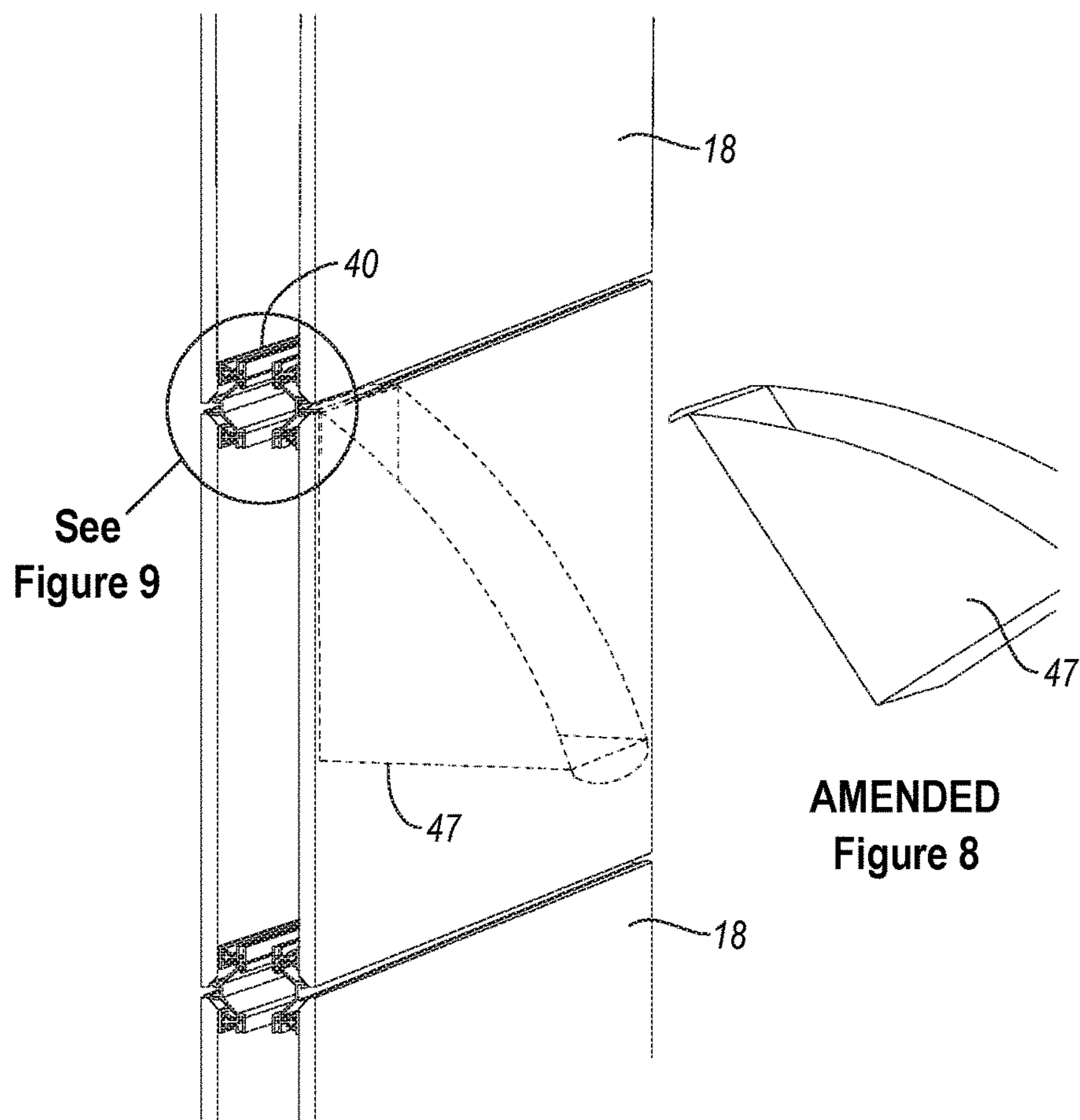
Figure 5



AMENDED
Figure 6



AMENDED
Figure 7



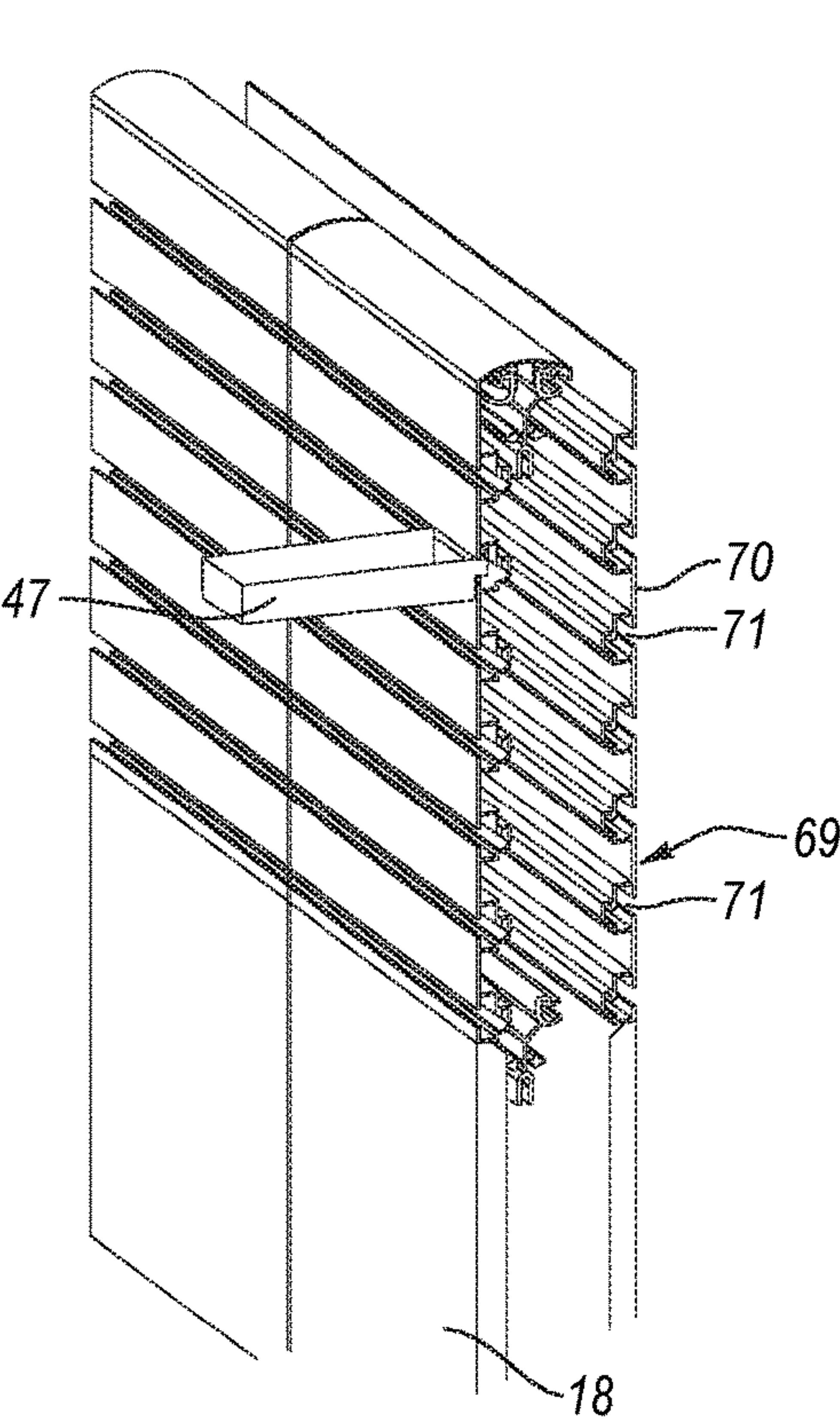


Figure 10

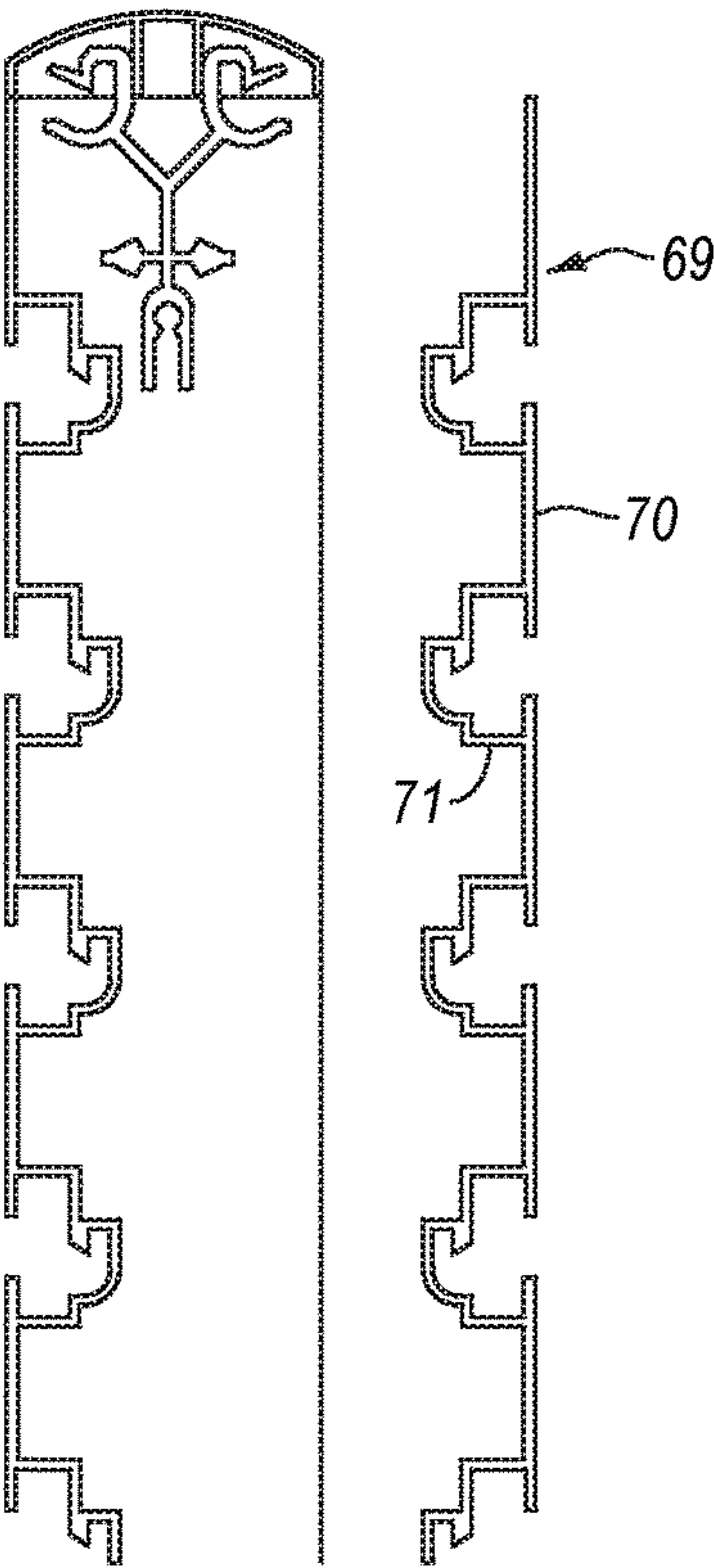


Figure 11

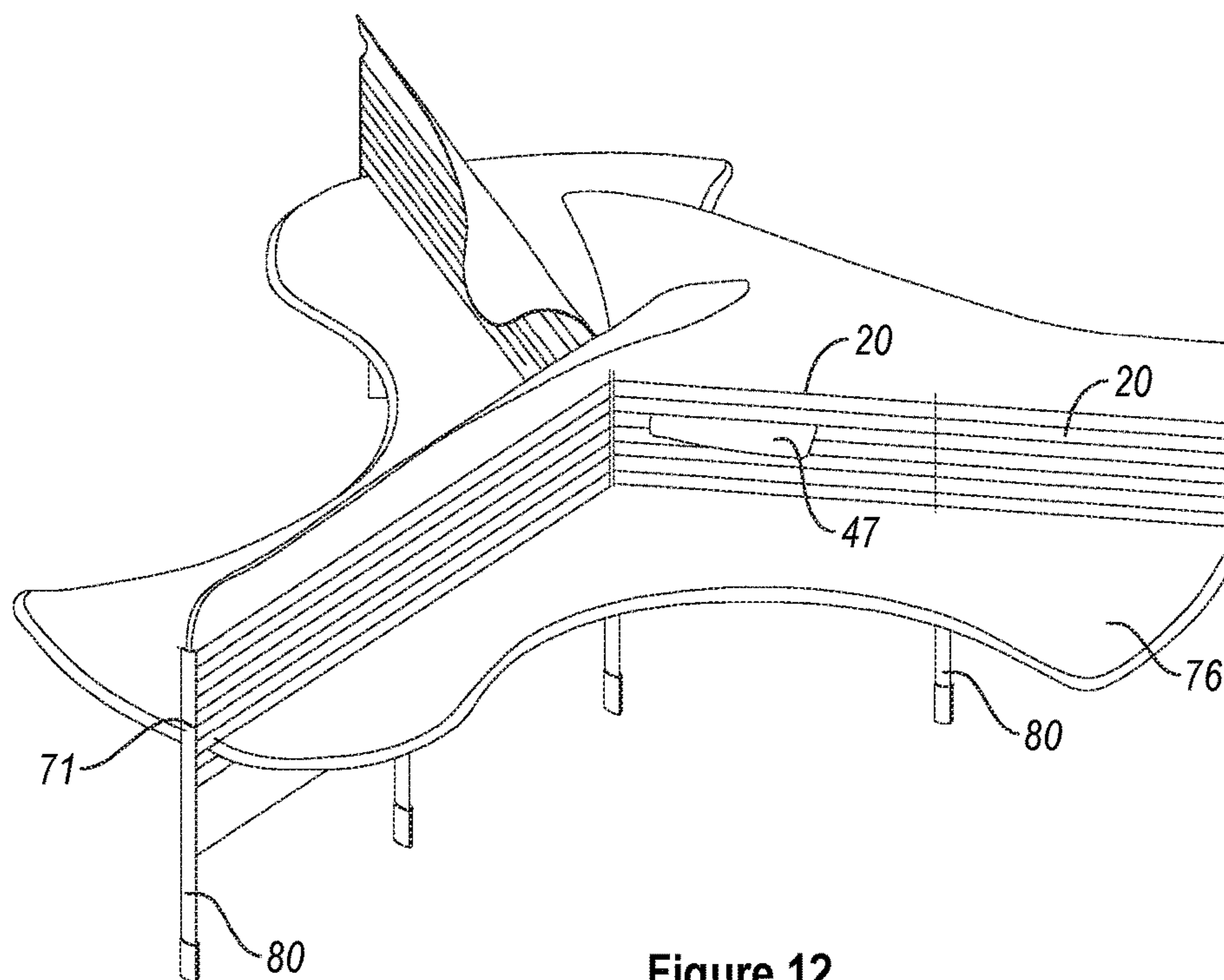
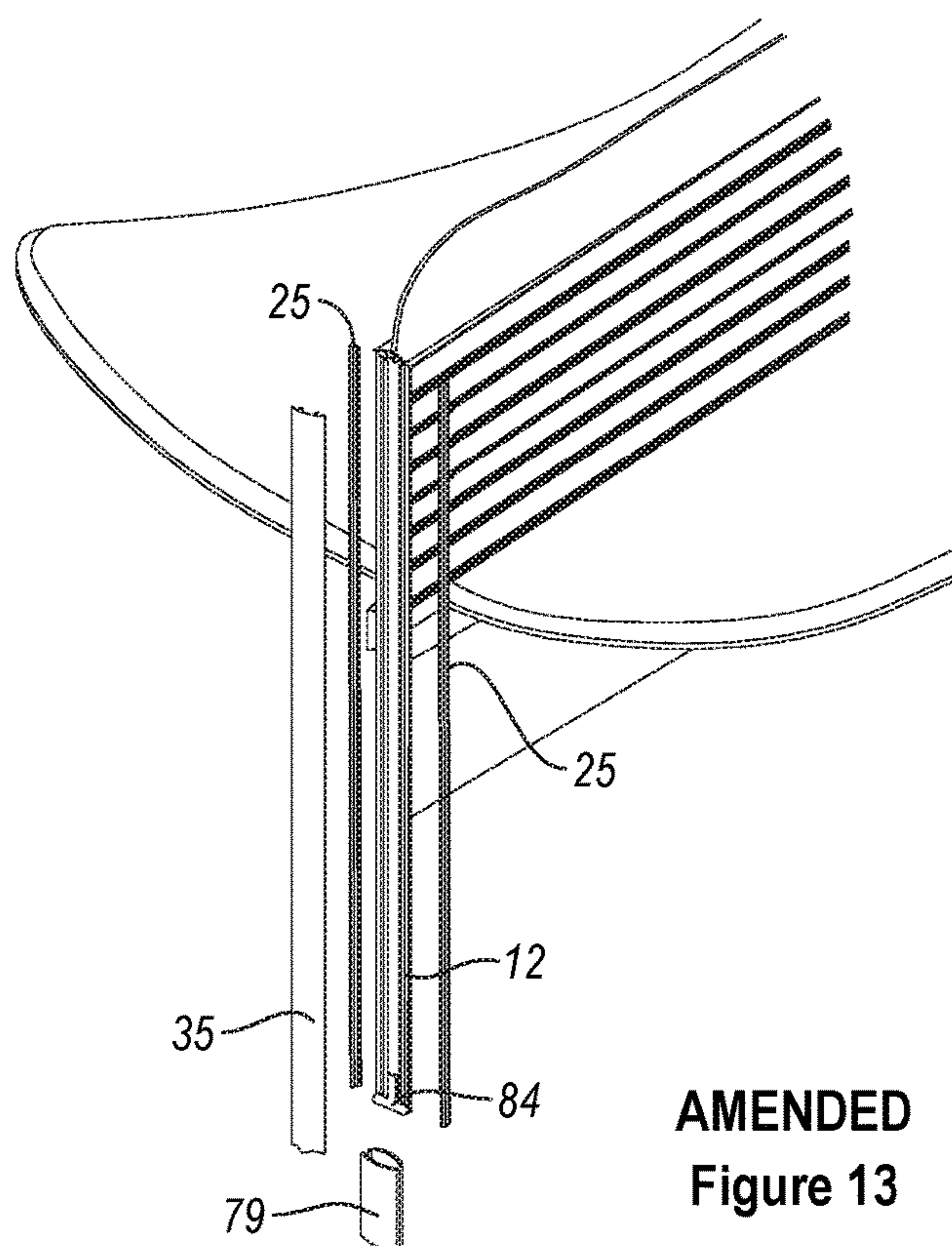


Figure 12



AMENDED
Figure 13

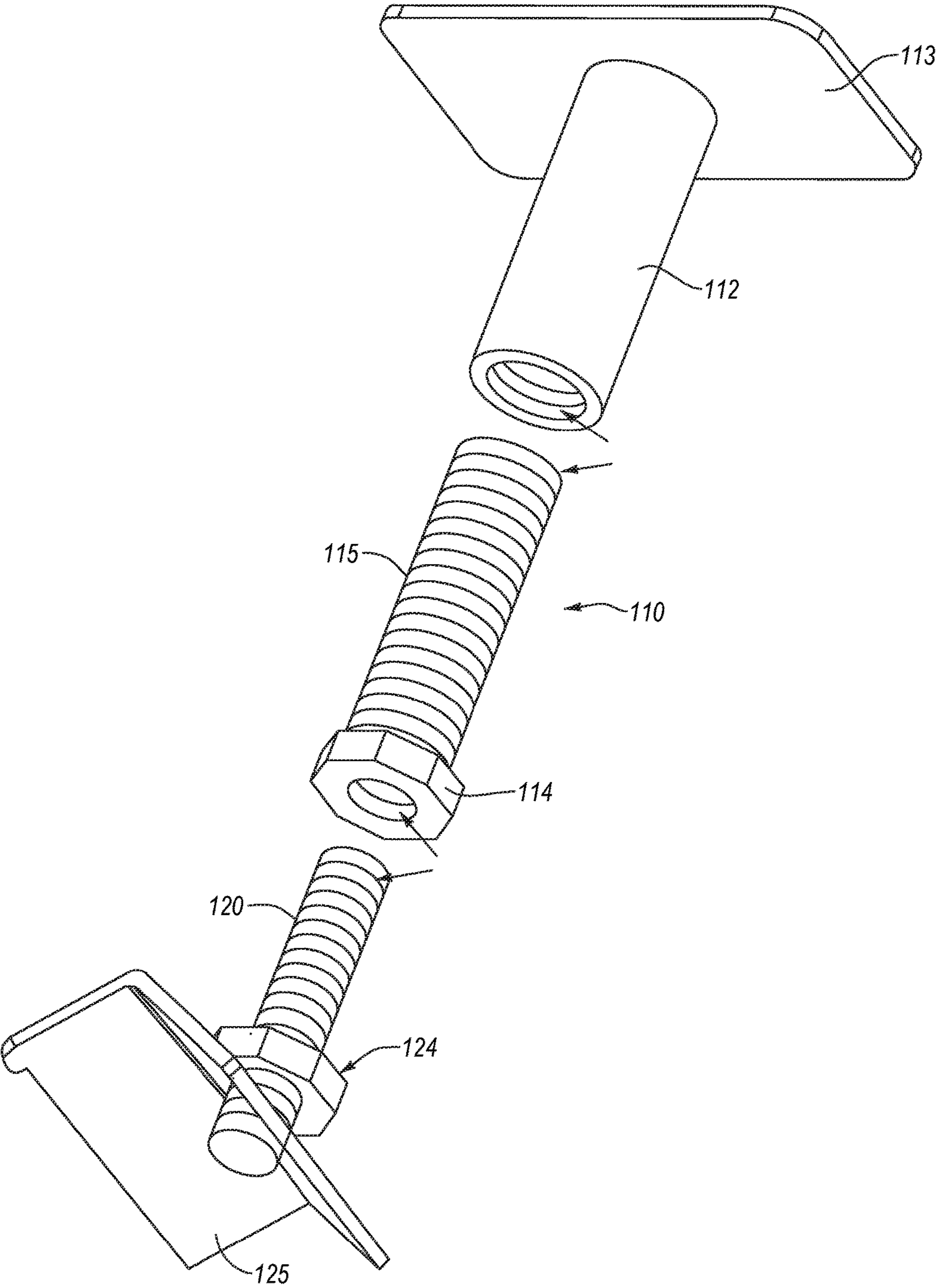
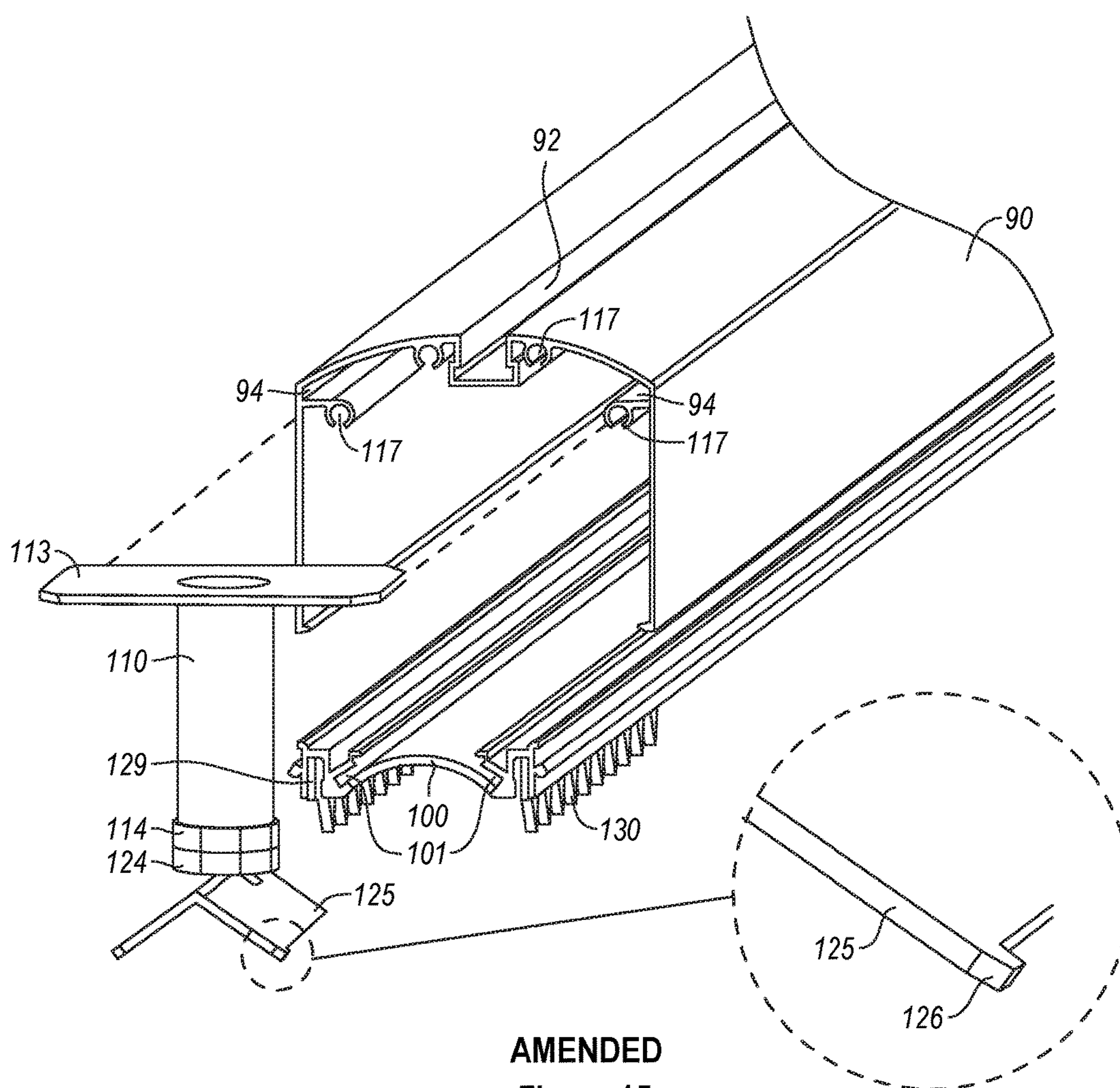
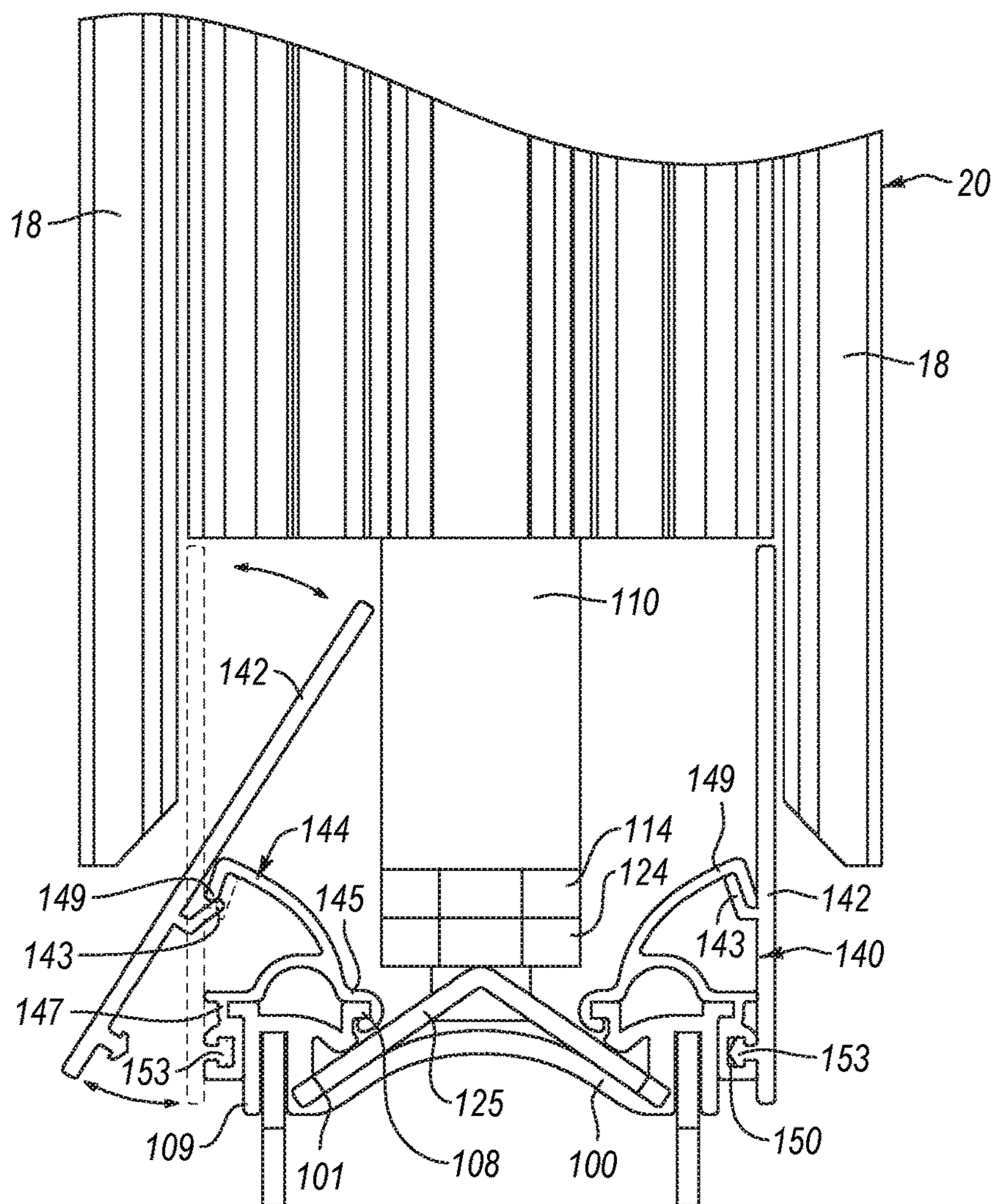
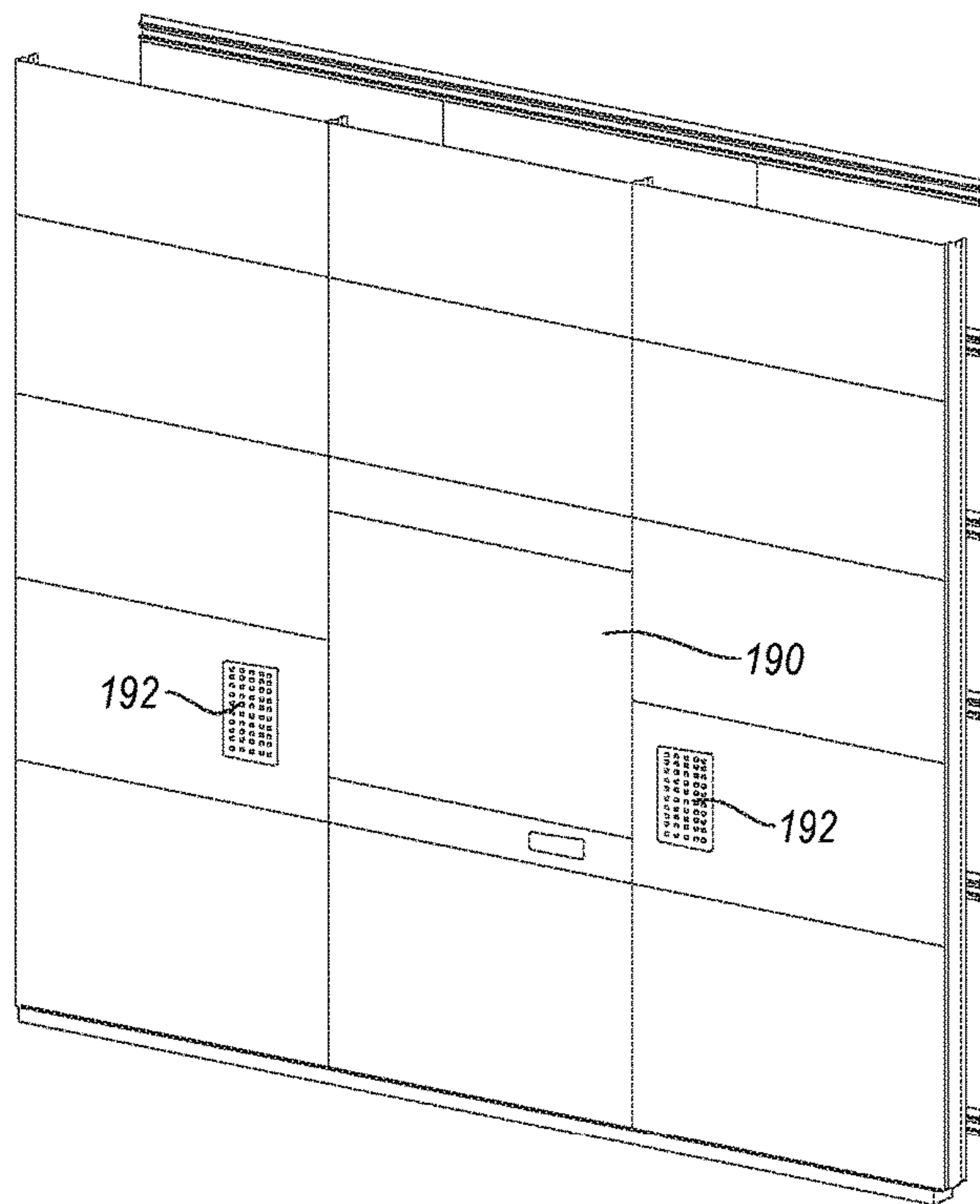


Figure 14

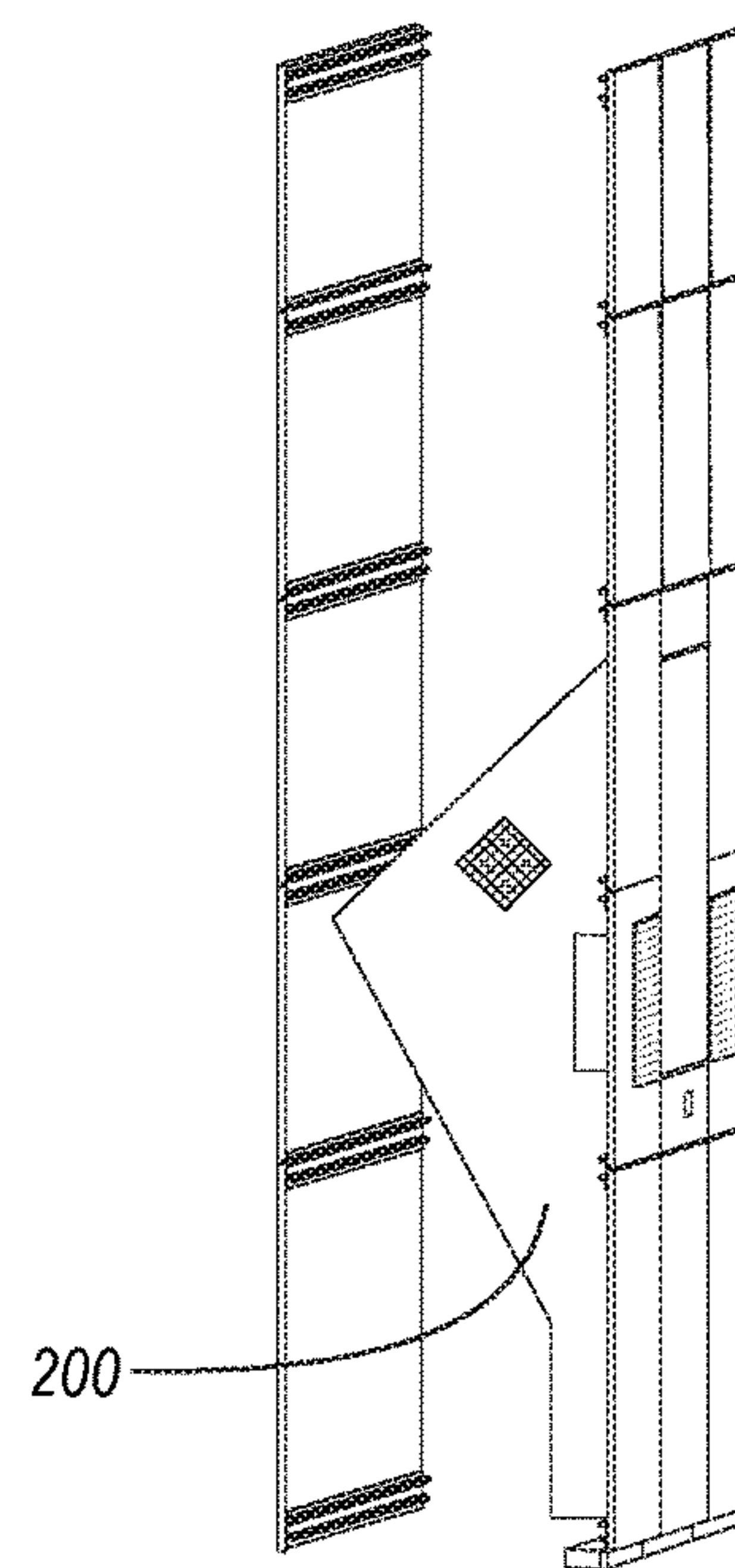




AMENDED
Figure 16



AMENDED
Figure 17



AMENDED
Figure 18

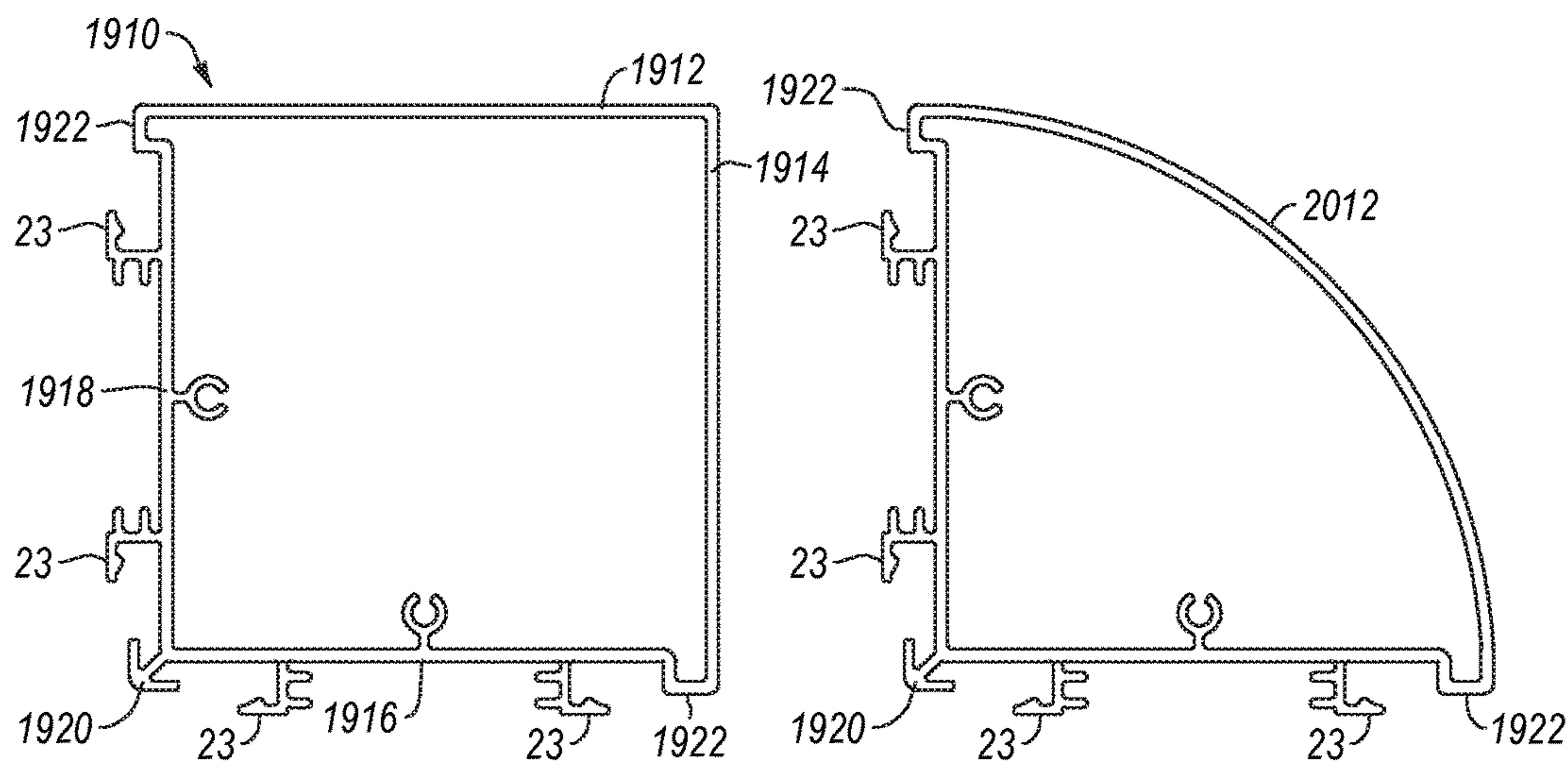


Figure 19

Figure 20

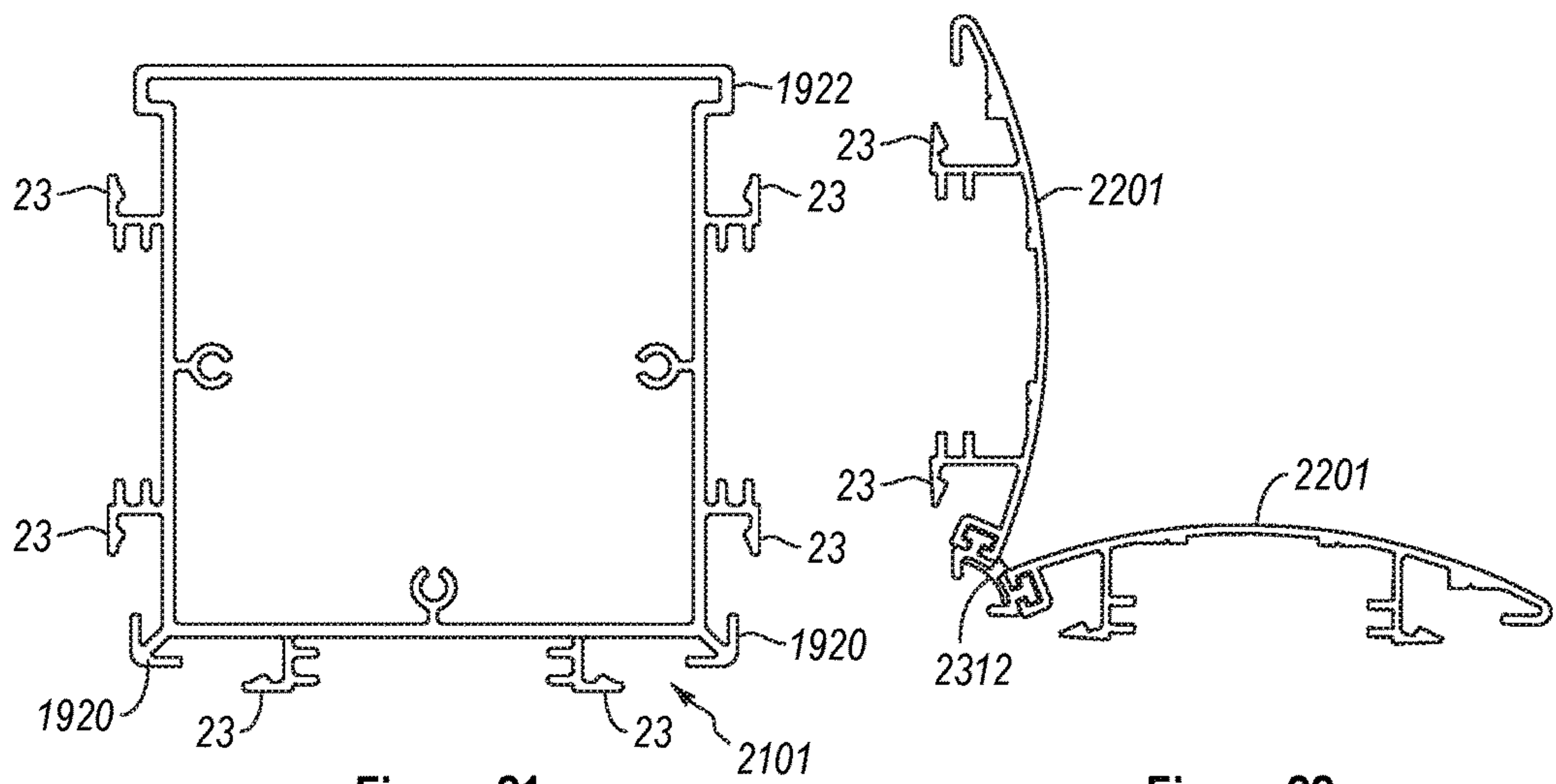


Figure 21

Figure 22

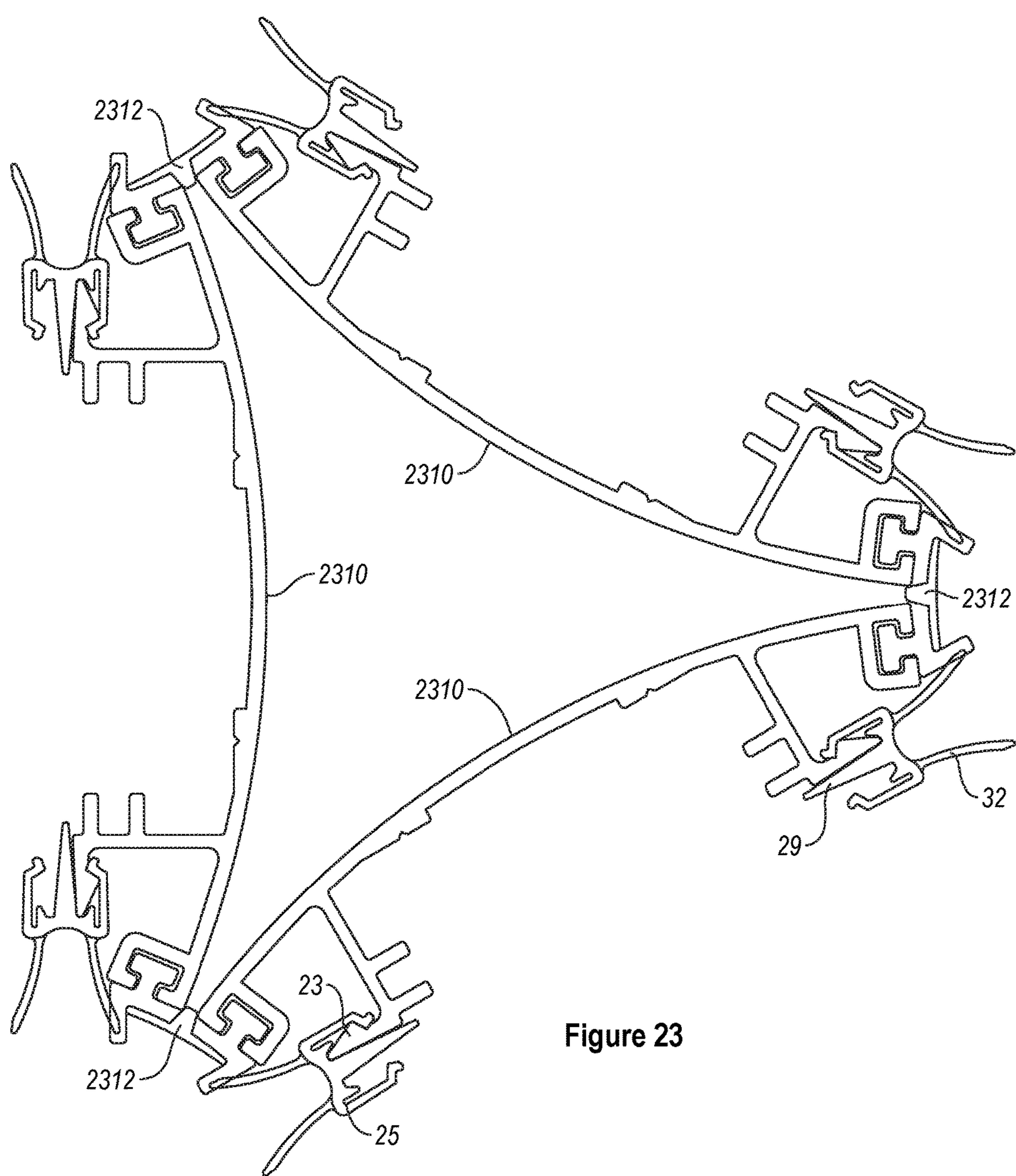


Figure 23

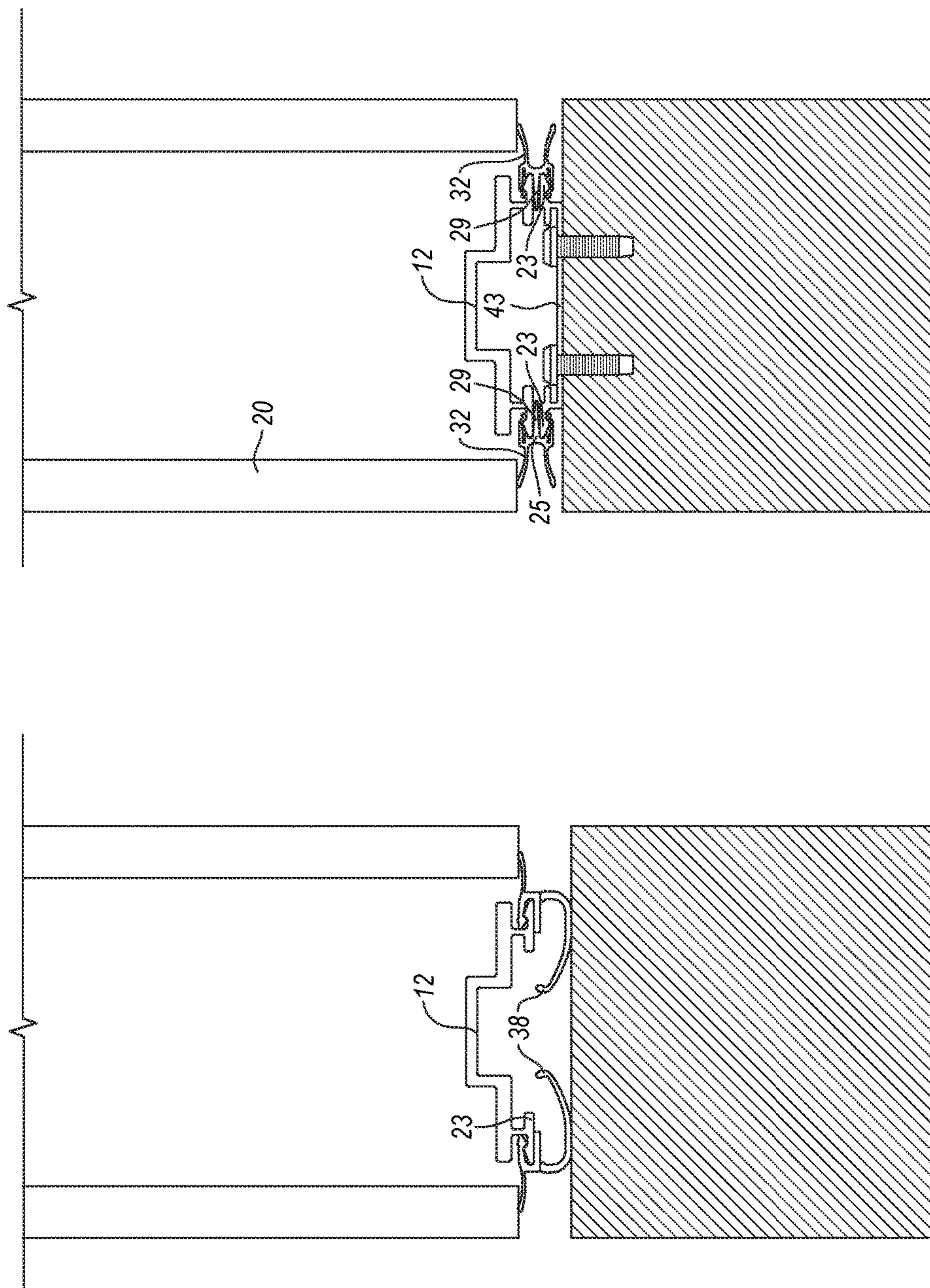
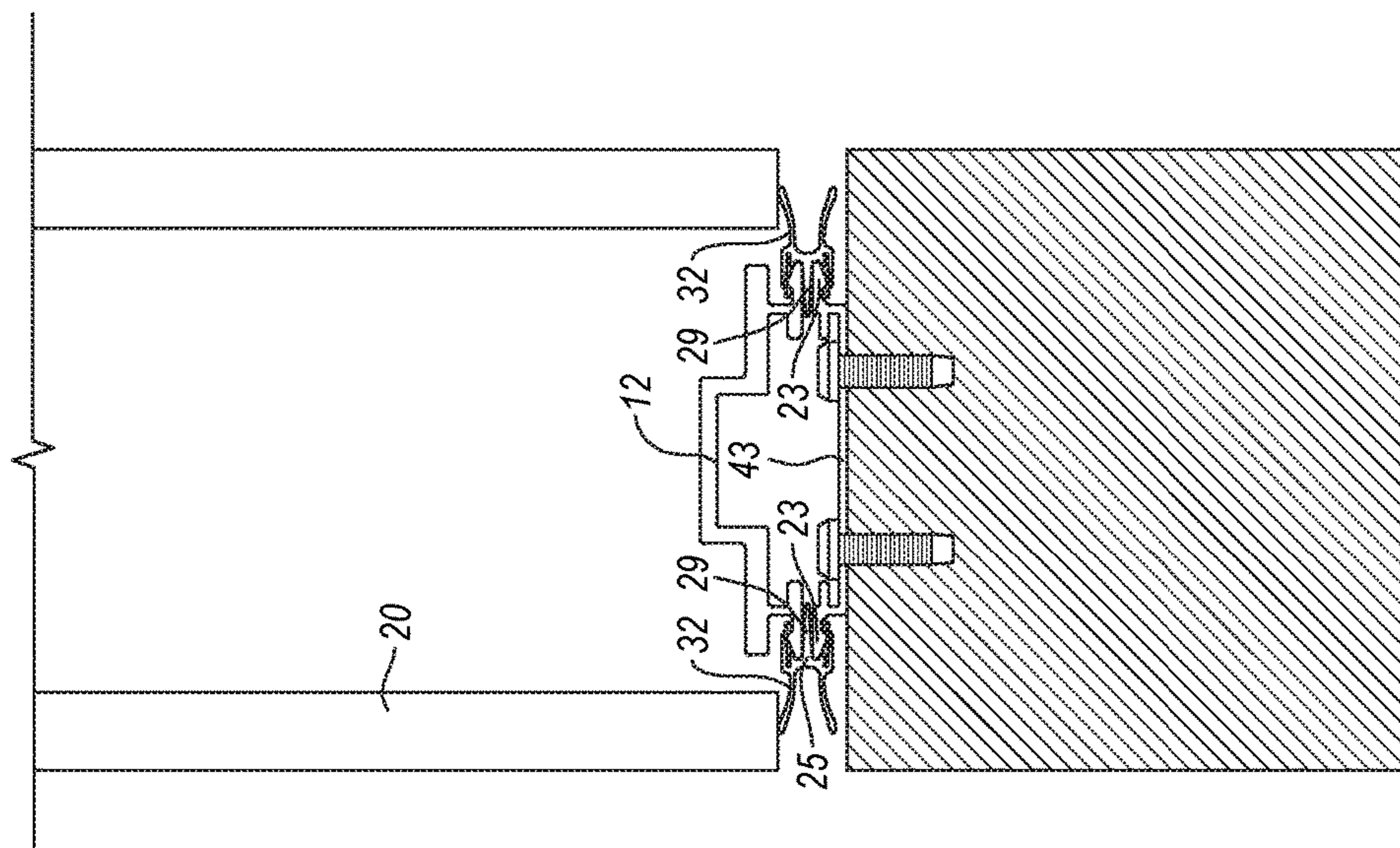


Figure 24



AMENDED
Figure 25

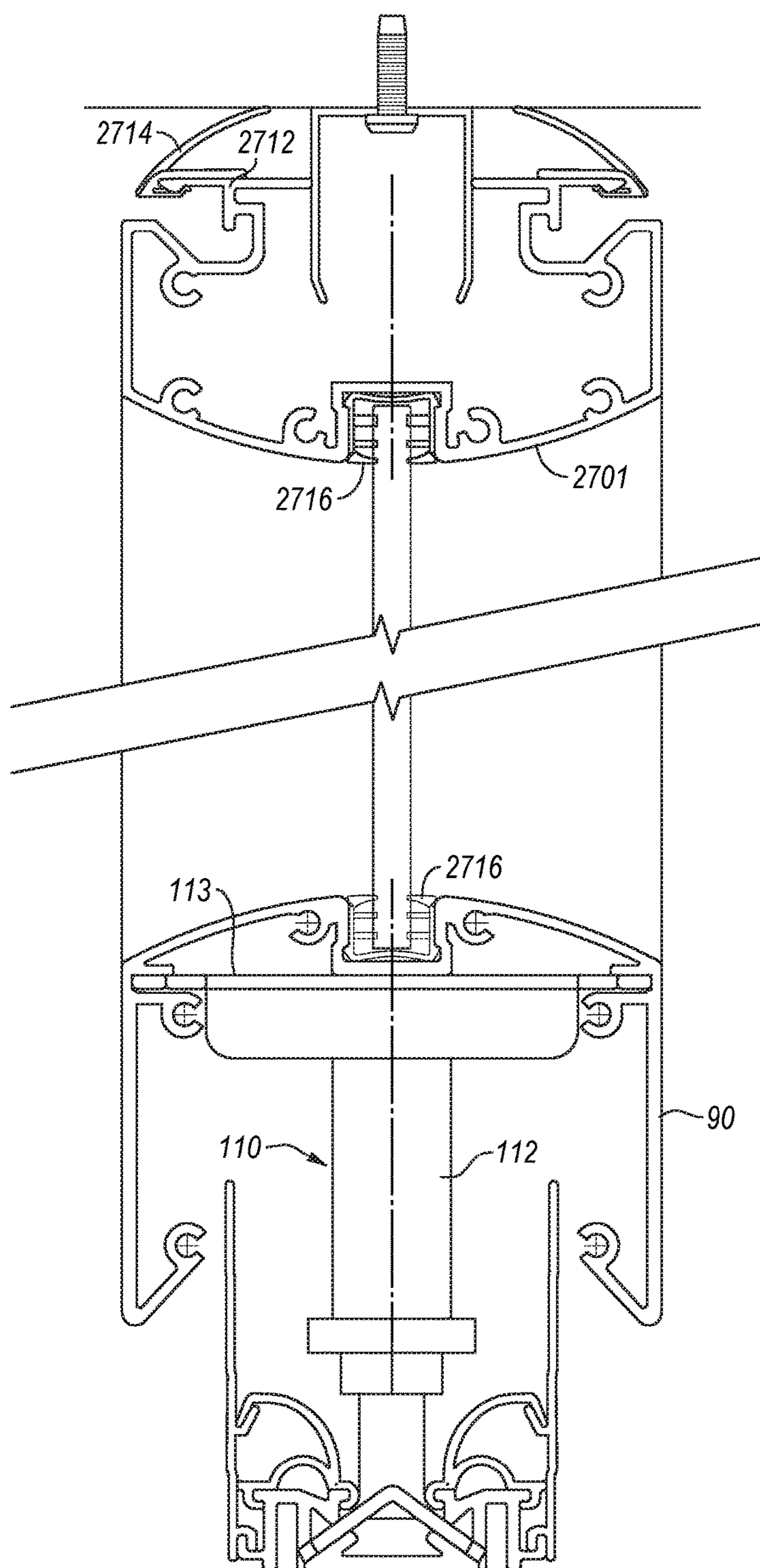
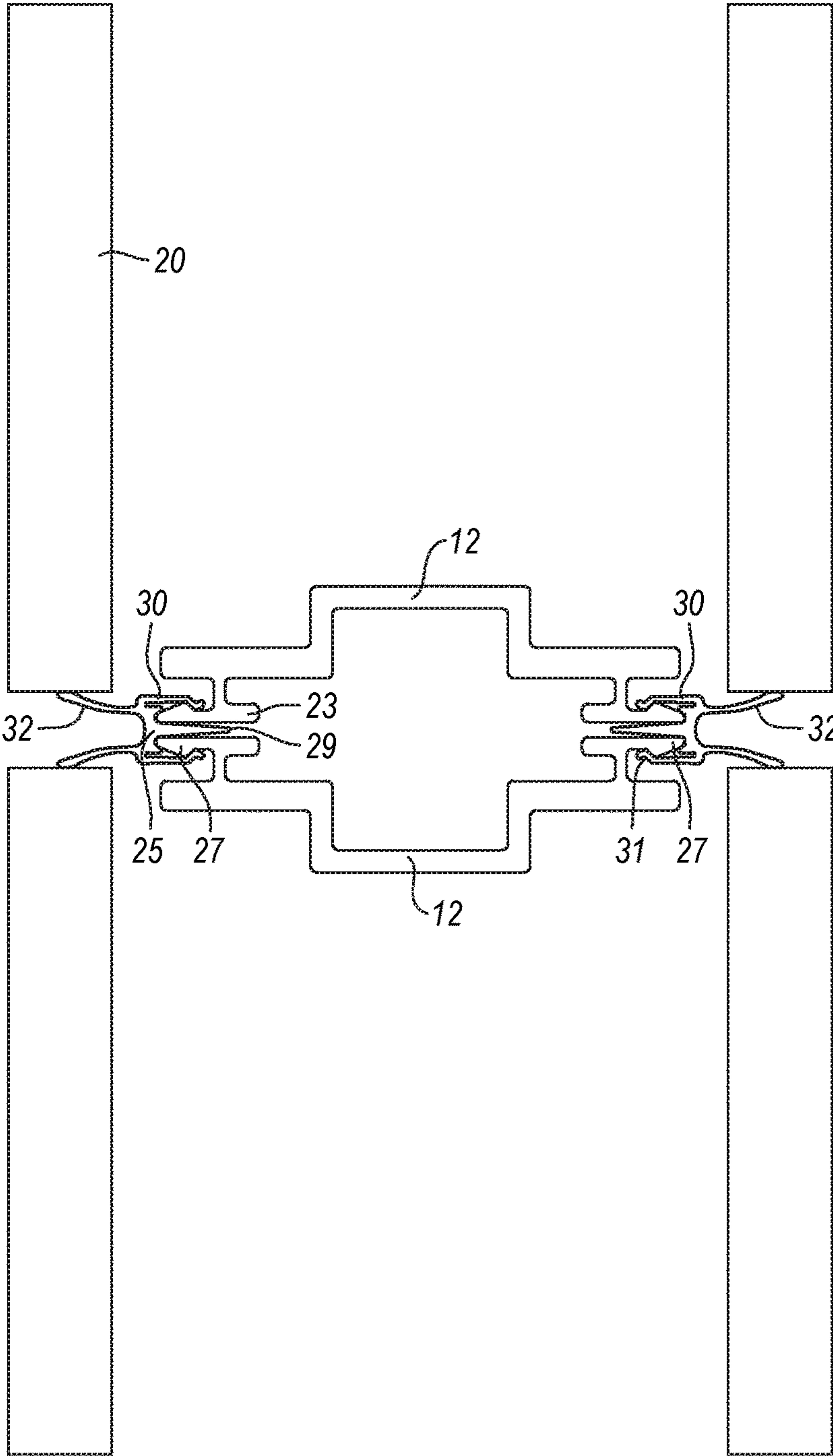


Figure 27



AMENDED
Figure 28

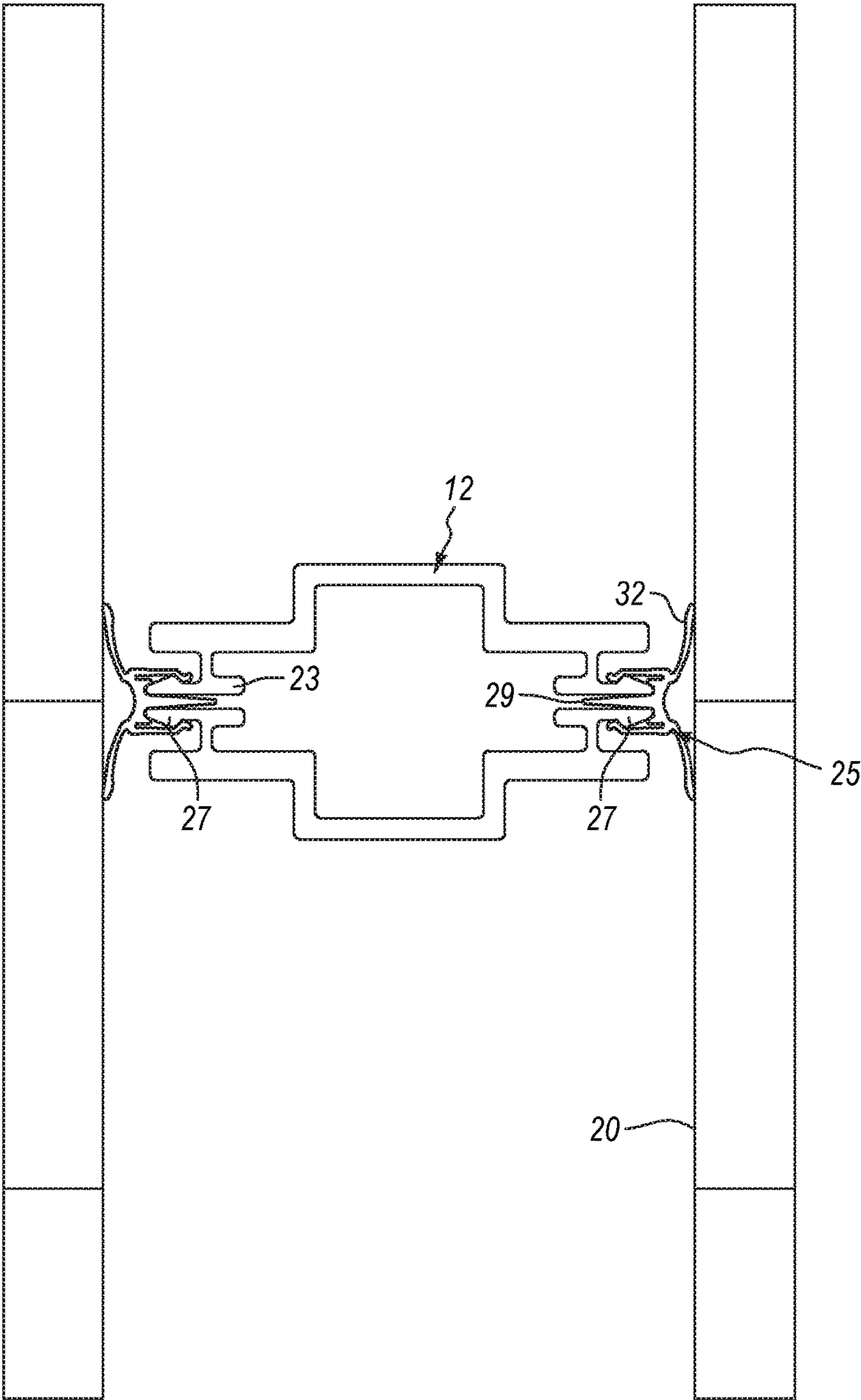


Figure 29

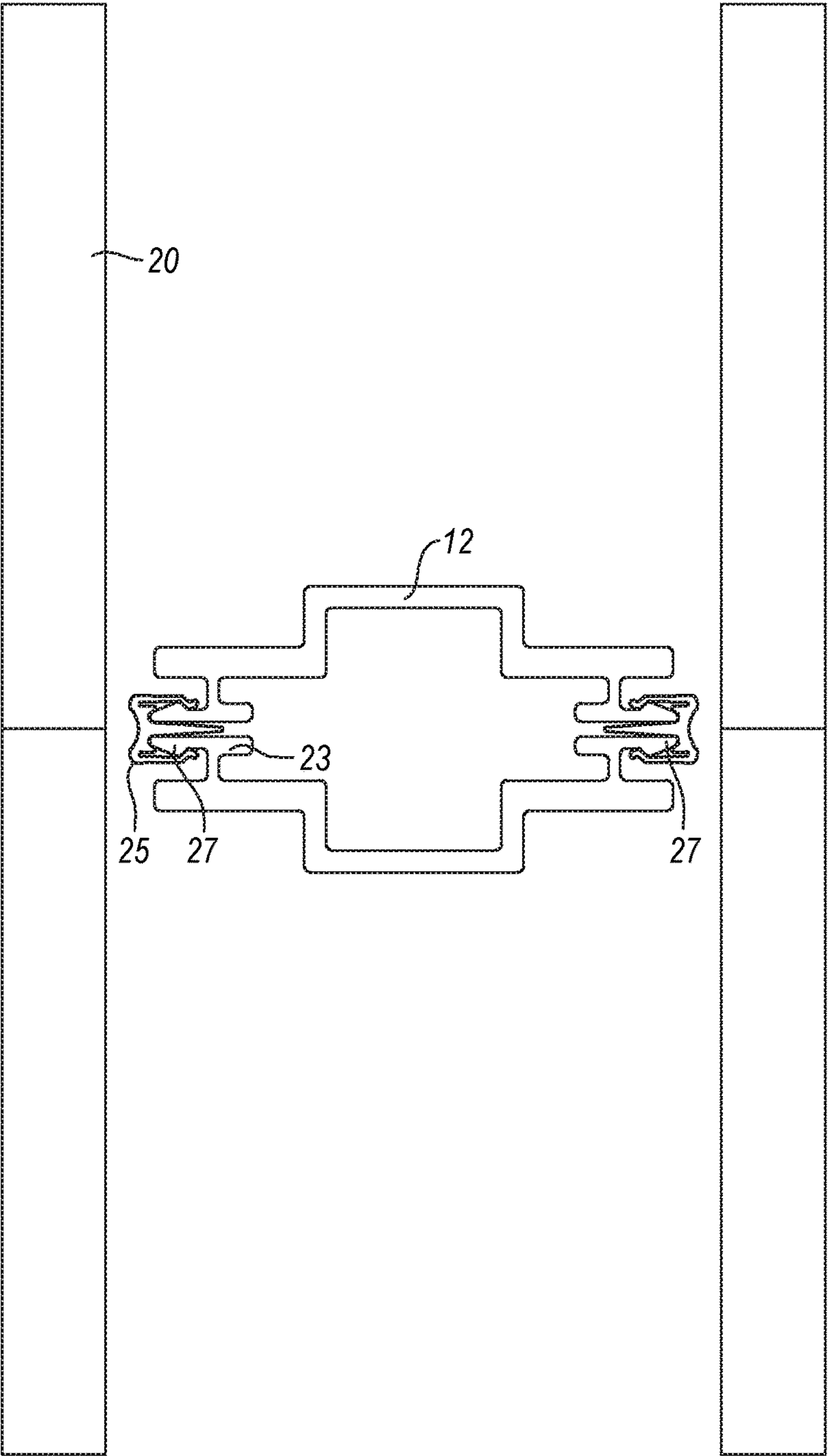


Figure 30

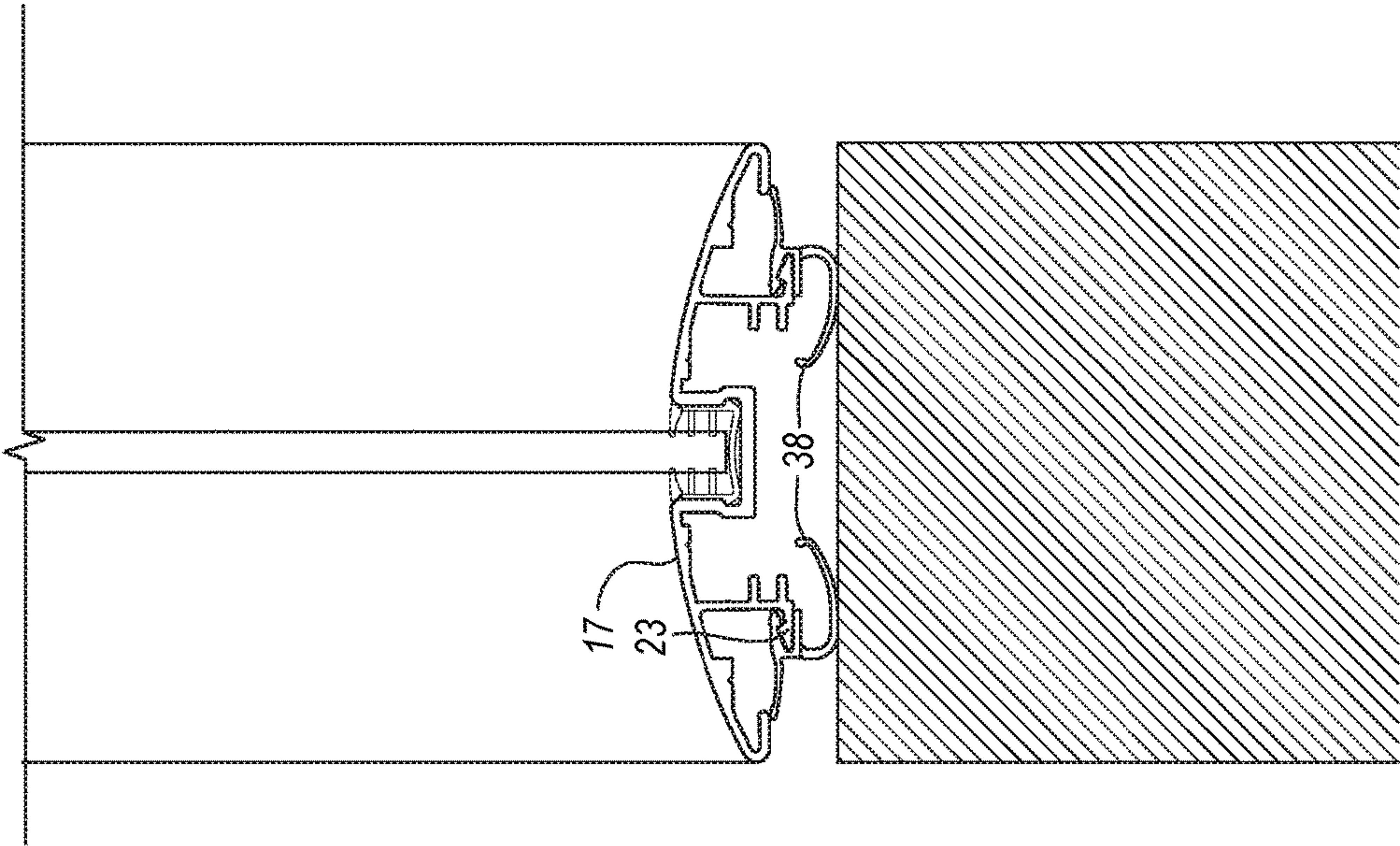
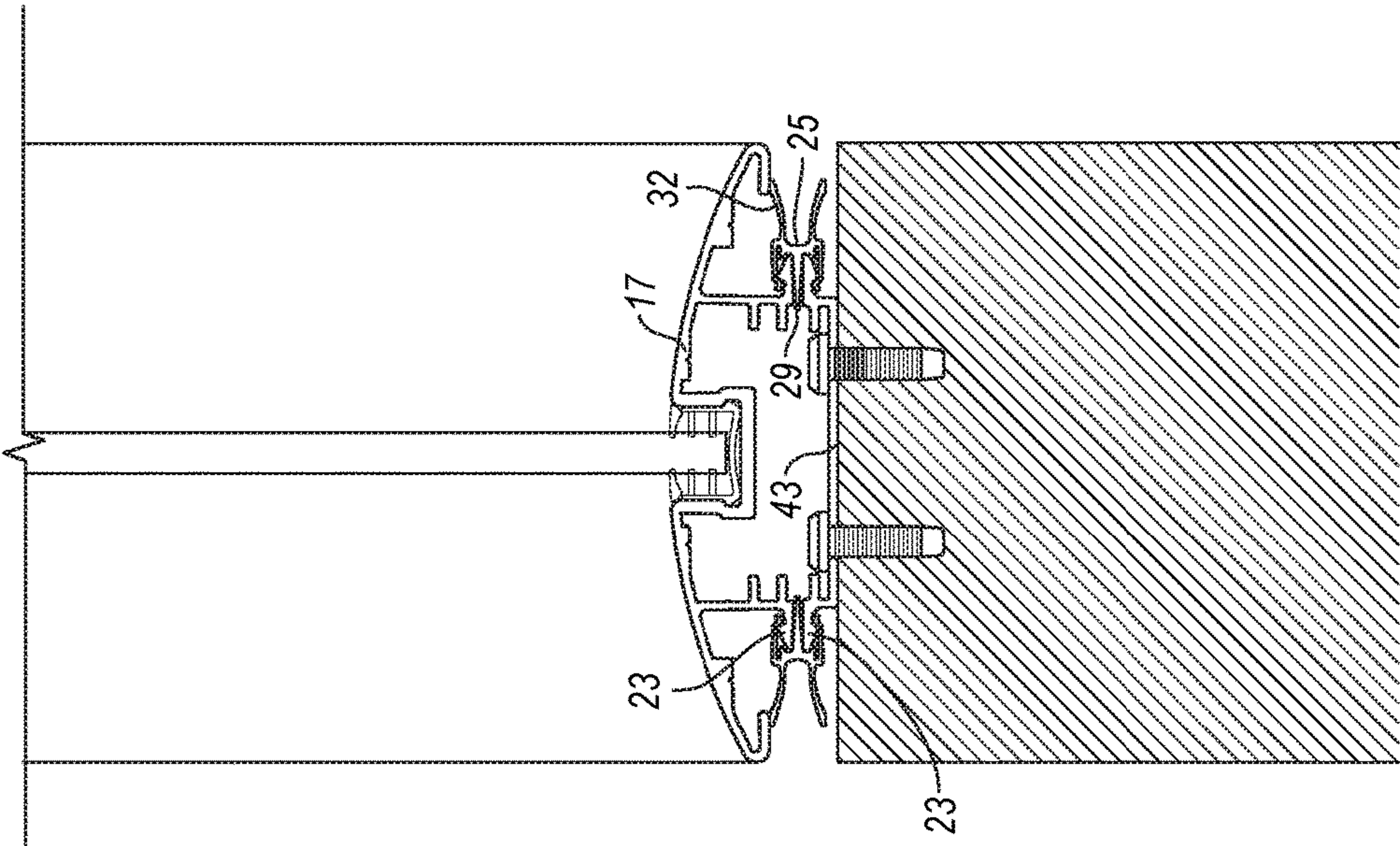


Figure 32



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, Reissue application Ser. No. 14/032,931, Reissue Divisional application Ser. No. 14/681,874, and Reissue application Ser. No. 15/074,383. This application is a continuation reissue of application Ser. No. 14/032,931, entitled "INTEGRATED RECONFIGURABLE WALL SYSTEM", filed Sep. 20, 2013, 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.*

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 plate 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 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 channels, 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

3

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. 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;

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;

4

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

5

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] it is 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 rearwardly 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

6

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 (within notch 19 of either frame 17) for a combination of finished looks. The upper and lower extrusions 90 (comprising notch 92, see also FIG. 15), 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 [connector strip 60] *tile clip* (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 [generally] protrusion (generally arrow shaped bead 64 formed along the edge of flanges [67]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 the 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 (*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 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 connecting said at least one wall module to the other of said second wall module, wall bracket, finishing trim or connection post.]

11

[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 connection 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;

12

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 reconfigurable wall system comprising:

a plurality of wall modules, each wall module being connectable to one or more other wall modules;

at least one wall module of the plurality of wall modules having front and rear surfaces and top, bottom, right side, and left side edges, the at least one wall module being configured to support and have coupled to at least one of the front and rear surfaces thereof one or more wall tiles;

at least another wall module of the plurality of wall modules having a front edge and a rear edge defined by opposing, visible outer surfaces of first and second vertical end frames, a top side edge, a bottom side

13

edge, a right side edge, and a left side edge, the at least another wall module comprising a divider between the front edge and the rear edge;

wherein:

the at least another wall module is selectively connectable to the at least one wall module such that the at least another wall module is positioned above or below the at least one wall module, and

the at least another wall module comprises a pair of spaced apart end frames, each end frame having a notch formed therein, wherein the divider is received and held within the notches; and

a leveling system having:

a foot;

a leveler engaging and supported by said foot and engaging and supporting a horizontal member a lowermost module of the at least one or at least another wall module;

wherein said leveler

(a) has a height that is capable of being adjusted and

(b) has a horizontal location that was established by sliding said leveler horizontally relative to, and while engaging said horizontal member and/or said foot.

27. The system as recited in claim 26, wherein the at least one wall module comprises a pair of spaced apart vertical end frames.

28. The system as recited in claim 27, wherein the pair of spaced apart vertical end frames are connected to one another by a plurality of stringers.

29. The system as recited in claim 28, wherein the plurality of stringers are configured to have the one or more wall tiles coupled thereto.

30. The system as recited in claim 26, wherein the top edge of the at least one wall module and the bottom edge of the at least another wall module are configured to enable the at least another wall module to be connected on top of the at least one wall module.

31. The system as recited in claim 26, wherein the top edge of the at least another wall module and the bottom edge of the at least one wall module are configured to enable the at least one wall module to be connected on top of the at least another wall module.

32. The system as recited in claim 26, wherein the at least one wall module and the at least another wall module each comprise a pair of spaced apart vertical end frames.

33. The system as recited in claim 32, wherein a vertical end frame of the at least one wall module is connectable to a vertical end frame of the at least another wall module to connect together the at least one wall module and the at least another wall module.

34. The system as recited in claim 33, wherein the vertical end frame of the at least one wall module is connectable to the vertical end frame of the at least another wall module with a spline.

35. The system as recited in claim 26, further comprising one or more wall tiles coupled to the at least one wall module.

36. The system as recited in claim 35, wherein the one or more wall tiles comprise wood, metal, fabric, or glass.

37. The system as recited in claim 26, further comprising another divider coupled to the at least another wall module.

38. The system as recited in claim 37, wherein each divider comprises glass or plastic.

39. The system as recited in claim 37, wherein each divider is transparent.

14

40. The system as recited in claim 37, wherein at least one of the dividers is held into place at least in part by a continuous notch in the bottom side edge that extends from the left side edge to the right side edge.

41. The system as recited in claim 26, wherein the at least one wall module and the at least another wall module have substantially equal widths.

42. A reconfigurable wall system comprising:

a first wall module comprising first and second tiles coupled to a stringer interconnecting one or more first vertical end frames to another of the one or more first vertical end frames, wherein the stringer comprises a continuous channel extending the length of the stringer; and

a second wall module comprising a first divider coupled to one or more second vertical end frames between a first front edge and a first rear edge of the first wall module, wherein the first wall module and the second wall module are selectively connectable to one another such that the second wall module may be positioned above or below the first wall module to selectively adjust the height of a reconfigurable wall;

wherein the continuous channel is configured to receive a wall accessory via a receiving feature;

wherein:

the continuous channel is accessible from outside of the first and second tiles;

the 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.

43. The system as recited in claim 42, wherein the first and second tiles are connected to the one or more first vertical end frames by one or more stringers.

44. The system as recited in claim 43, wherein the one or more first vertical end frames comprise two spaced apart vertical end frames.

45. The system as recited in claim 44, wherein a plurality of stringers are coupled between the two spaced apart vertical end frames.

46. The system as recited in claim 42, wherein each of the one or more second vertical end frames comprises a notch configured to receive and hold the divider therein.

47. The system as recited in claim 42, wherein the second wall module further comprises one or more horizontal frame elements connected to the one or more second vertical end frames.

48. The system as recited in claim 47, wherein at least one of the one or more horizontal frame elements comprises a notch configured to receive and hold the divider therein.

49. The system as recited in claim 42, wherein at least one of the one or more first vertical end frames and at least one of the one or more second vertical end frames are configured to be secured together to connect the first wall module to the second wall module.

50. The system as recited in claim 49, wherein the at least one of the one or more first vertical end frames and the at least one of the one or more second vertical end frames are configured to be secured together with a spline.

51. The system as recited in claim 42, wherein the one or more tiles comprise wood, metal, fabric, or glass.

52. The system as recited in claim 42, wherein the divider comprises glass or plastic.

53. The system as recited in claim 42, wherein the divider is transparent.

54. The system as recited in claim 42, wherein at least one of the first wall module and the second wall module is

15

configured to be connected along a left or right vertical edge thereof to a vertical edge of a third wall module.

55. A reconfigurable wall system comprising:

a first wall module having a pair of spaced apart first vertical end frames, one or more stringers extending between and connected to the first vertical end frames, and one or more tiles connected to the one or more stringers on at least one of a front surface and a rear surface of the first wall module; and

a second wall module having a pair of spaced apart second vertical end frames, top and bottom horizontal frame elements extending between and connected to the second vertical end frames, and a divider mounted between the second vertical end frames and the top and bottom horizontal frame elements such that the divider is disposed between a front edge and a rear edge of the first wall module;

wherein:

the first wall module and the second wall module are selectively connectable to one another such that the second wall module may be positioned above or below the first wall module to selectively adjust the height of a reconfigurable wall formed, at least in part, by the first and second wall modules, and

a bottom edge of the divider is inset into the bottom horizontal frame element; and

16

a leveling system having:

a foot having one or more grooves formed therein, the foot providing an upwardly curved surface; and

a leveler engaging and supported by said foot, said leveler horizontally engaging and supporting a horizontal member of said lowermost of the first or second wall modules, wherein said leveler

(a) has a height that is capable of being adjusted and

(b) has a non-planar base that rests upon the upwardly curved surface of said foot.

56. The system as recited in claim 55, wherein the divider is transparent.

57. The system as recited in claim 55, wherein at least one of the second vertical end frames comprises a notch configured to receive and hold an edge of the divider.

58. The system as recited in claim 55, wherein at least one of the top and bottom horizontal frame elements comprises a continuous notch extending a length of the frame element configured to receive and hold an edge of the divider.

59. The system as recited in claim 55, wherein the first wall module and the second wall module are configured to be connected together with a spline.

60. The system as recited in claim 55, wherein at least one of the first wall module and the second wall module is configured to be connected along a left or right vertical edge thereof to a vertical edge of a third wall module.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : RE47,132 E
APPLICATION NO. : 14/305819
DATED : November 20, 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 15-27 (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, 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 (the present application), 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, 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