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(12) **United States Design Patent** (10) **Patent No.:** **US D883,048 S**  
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(54) **EMITTER PART**  
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(57) **CLAIM**

We claim the ornamental design for an emitter part, as shown and described.

**DESCRIPTION**

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(51) **LOC (12) Cl.** ..... **08-01**  
(52) **U.S. Cl.**  
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(58) **Field of Classification Search**  
USPC ..... D8/1; D24/152  
CPC .... A01G 25/023; A01G 25/026; A01G 25/02; Y02A 40/237  
See application file for complete search history.

FIG. 1 is a perspective view of an emitter part in accordance with a first embodiment of our new design;  
FIG. 2 is a top view of the emitter part of FIG. 1;  
FIG. 3 is a bottom view of the emitter part of FIGS. 1-2;  
FIG. 4 is a rear elevation view of the emitter part of FIGS. 1-3;  
FIG. 5 is a front elevation view of the emitter part of FIGS. 1-4;  
FIG. 6 is a right side elevation view of the emitter part of FIGS. 1-5;  
FIG. 7 is a left side elevation view of the emitter part of FIGS. 1-6;  
FIG. 8 is a perspective view of an alternate emitter part in accordance with a second embodiment of our new design;  
FIG. 9 is a top view of the emitter part of FIG. 8;  
FIG. 10 is a bottom view of the emitter part of FIGS. 8-9;  
FIG. 11 is a rear elevation view of the emitter part of FIGS. 8-10;  
FIG. 12 is a front elevation view of the emitter part of FIGS. 8-11;  
FIG. 13 is a right side elevation view of the emitter part of FIGS. 8-12; and,  
FIG. 14 is a left side elevation view of the emitter part of FIGS. 8-13.  
The broken lines represent portions of the article and form no part of the claimed design.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

2,174,515 A 10/1939 Hughes  
2,449,731 A 9/1948 Therrien  
2,508,403 A 5/1950 Knauss  
(Continued)

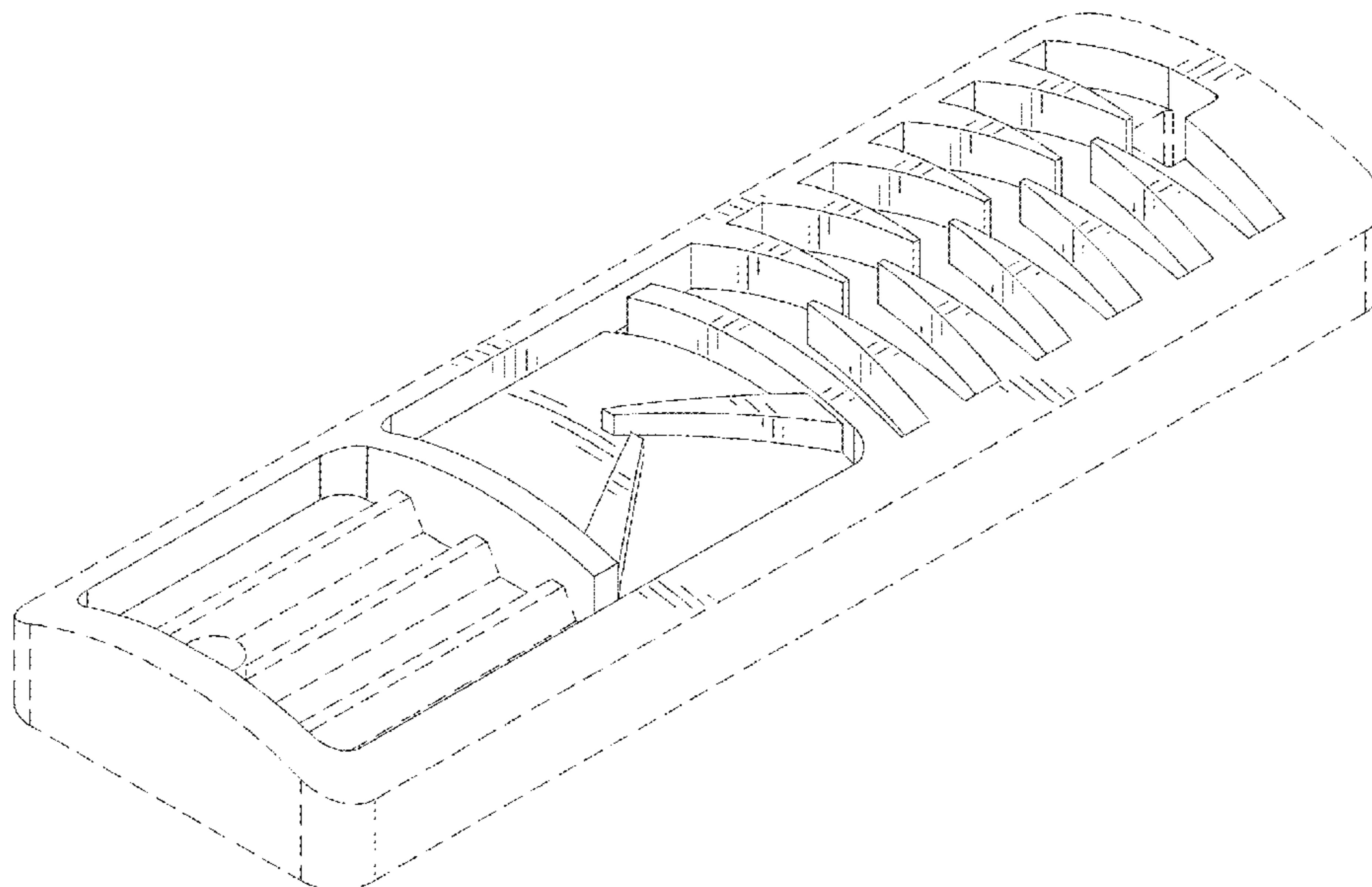
**FOREIGN PATENT DOCUMENTS**

AU 511876 10/1978  
AU 2004208646 3/2006  
(Continued)

**OTHER PUBLICATIONS**

European Patent Application No. 18172143.2, Extended European Search Report, dated Oct. 15, 2018, 9 pages.  
(Continued)

**1 Claim, 12 Drawing Sheets**



(56)

## References Cited

## U.S. PATENT DOCUMENTS

2,625,429 A	1/1953	Coles	4,054,152 A	10/1977	Ito
2,639,194 A	5/1953	Wahlin	4,058,257 A	11/1977	Spencer
2,683,061 A	7/1954	Shahnazarian	4,059,228 A	11/1977	Werner
2,762,397 A	9/1956	Miller	4,077,570 A	3/1978	Harmony
2,794,321 A	6/1957	Warner	4,077,571 A	3/1978	Harmony
2,873,030 A	2/1959	Ashton	4,084,749 A	4/1978	Drori
2,970,923 A	2/1961	Sparmann	4,092,002 A	5/1978	Grosse
3,004,330 A	10/1961	Wilkins	4,095,750 A	6/1978	Gilead
3,155,612 A	11/1964	Weber	4,105,162 A	8/1978	Drori
3,182,916 A	5/1965	Schulz	4,121,771 A	10/1978	Hendrickson
3,199,901 A	8/1965	Jeppsson	4,122,590 A	10/1978	Spencer
3,302,450 A	2/1967	Wakar	4,128,918 A	12/1978	Wenk
3,323,550 A	6/1967	Lee, II	4,132,364 A	1/1979	Harmony
3,361,359 A	1/1968	Chapin	4,134,550 A	1/1979	Bright
3,420,064 A	1/1969	Blass	4,143,820 A	3/1979	Bright
3,426,544 A	2/1969	Curtis	4,147,307 A	4/1979	Christy
3,434,500 A	3/1969	Burrows	4,160,323 A	7/1979	Tracy
3,467,142 A	9/1969	Donn	4,161,291 A	7/1979	Bentley
3,586,291 A	6/1971	Malec	4,177,946 A	12/1979	Sahagun-Barragan
3,672,571 A	6/1972	Goodricke	4,177,947 A	12/1979	Menzel
3,693,888 A	9/1972	Christy	4,196,753 A	4/1980	Hammarstedt
3,697,002 A	10/1972	Parkison	4,196,853 A	4/1980	Delmer
3,698,195 A	10/1972	Chapin	4,209,133 A	6/1980	Mehouadar
3,719,327 A	3/1973	McMahon	4,210,287 A	7/1980	Mehouadar
3,727,635 A	4/1973	Todd	4,215,822 A	8/1980	Mehouadar
3,729,142 A	4/1973	Leal	4,223,838 A	9/1980	Maria-Vittorio-Torrisi
3,753,527 A	8/1973	Galbraith	4,225,307 A	9/1980	Magera
3,777,980 A	12/1973	Allport	4,226,368 A	10/1980	Hunter
3,777,987 A	12/1973	Allport	4,235,380 A	11/1980	Delmer
3,779,468 A	12/1973	Spencer	4,247,051 A	1/1981	Allport
3,780,946 A	12/1973	Bowen	4,250,915 A	2/1981	Rikuta
3,791,587 A	2/1974	Drori	4,273,286 A	6/1981	Menzel
3,792,588 A	2/1974	Gilaad	4,274,597 A	6/1981	Dobos
3,797,741 A	3/1974	Spencer	4,281,798 A	8/1981	Lemelstrich
3,804,334 A	4/1974	Curry	4,307,841 A	12/1981	Mehouadar
3,807,430 A	4/1974	Keller	4,331,293 A	5/1982	Rangel-Garza
3,814,377 A	6/1974	Todd	4,344,576 A	8/1982	Smith
3,815,636 A	6/1974	Menzel	4,354,639 A	10/1982	Delmer
RE28,095 E	7/1974	Chapin	4,366,926 A	1/1983	Mehouadar
3,830,067 A	8/1974	Osborn	4,369,923 A	1/1983	Bron
3,833,019 A	9/1974	Diggs	4,384,680 A	5/1983	Mehouadar
3,851,896 A	12/1974	Olson	4,385,727 A	5/1983	Spencer
3,856,333 A	12/1974	Cox	4,385,757 A	5/1983	Muller
3,863,845 A	2/1975	Bumpstead	4,392,616 A	7/1983	Olson
3,866,833 A	2/1975	Kojimoto	4,413,786 A	11/1983	Mehouadar
3,870,236 A	3/1975	Sahagun-Barragan	4,413,787 A	11/1983	Gilead
3,873,030 A	3/1975	Barragan	4,423,838 A	1/1984	Dinur
3,874,598 A	4/1975	Havens	4,424,936 A	1/1984	Marc
3,882,892 A	5/1975	Menzel	4,430,020 A	2/1984	Robbins
3,885,743 A	5/1975	Wake	4,460,129 A	7/1984	Olson
3,895,085 A	7/1975	Hiroshi	4,473,191 A	9/1984	Chapin
3,896,999 A	7/1975	Barragan	4,473,525 A	9/1984	Drori
3,897,009 A	7/1975	Rangel-Garza	4,502,631 A	3/1985	Christen
3,903,929 A	9/1975	Mock	4,508,140 A	4/1985	Harrison
3,929,258 A	12/1975	Stephens	4,513,777 A	4/1985	Wright
3,939,875 A	2/1976	Osborn	4,519,546 A	5/1985	Gorney
3,940,066 A	2/1976	Hunter	4,522,339 A	6/1985	Costa
3,948,285 A	4/1976	Flynn	4,533,083 A	8/1985	Tucker
3,954,223 A	5/1976	Wichman	4,534,515 A	8/1985	Chapin
3,957,292 A	5/1976	Diggs	4,545,784 A	10/1985	Sanderson
3,966,233 A	6/1976	Diggs	4,572,756 A	2/1986	Chapin
3,970,251 A	7/1976	Harmony	4,573,640 A	3/1986	Mehouadar
3,973,732 A	8/1976	Diggs	4,593,857 A	6/1986	Raz
3,981,452 A	9/1976	Eckstein	4,613,080 A	9/1986	Benson
3,993,248 A	11/1976	Harmony	4,626,130 A	12/1986	Chapin
3,995,436 A	12/1976	Diggs	4,627,903 A	12/1986	Chapman
3,998,244 A	12/1976	Bentley	4,642,152 A	2/1987	Chapin
3,998,391 A	12/1976	Lemelshtrich	4,653,695 A	3/1987	Eckstein
3,998,427 A	12/1976	Bentley	4,687,143 A	8/1987	Gorney
4,008,853 A	2/1977	Tregillus	4,702,787 A	10/1987	Ruskin
4,017,958 A	4/1977	Diggs	4,718,608 A	1/1988	Mehouadar
4,022,384 A	5/1977	Hoyle	4,722,481 A	2/1988	Lemkin
4,036,435 A	7/1977	Pecaro	4,722,759 A	2/1988	Roberts
4,037,791 A	7/1977	Mullett	4,726,520 A	2/1988	Brown
4,047,995 A	9/1977	Leal-Diaz	4,726,527 A	2/1988	Mendenhall
			4,728,042 A	3/1988	Gorney
			4,735,363 A	4/1988	Shfaram
			4,749,130 A	6/1988	Utzinger
			4,753,394 A	6/1988	Goodman

(56)

## References Cited

## U.S. PATENT DOCUMENTS

4,756,339 A	7/1988	Buluschek	5,413,282 A	5/1995	Boswell
4,765,541 A	8/1988	Mangels	5,423,501 A	6/1995	Yu
4,775,046 A	10/1988	Gramarossa	5,441,203 A	8/1995	Swan
4,781,217 A	11/1988	Rosenberg	5,442,001 A	8/1995	Jones
4,789,005 A	12/1988	Griffiths	5,443,212 A	8/1995	Dinur
4,796,660 A	1/1989	Bron	5,449,250 A	9/1995	Burton
4,807,668 A	2/1989	Roberts	5,465,905 A	11/1995	Elder
4,817,875 A	4/1989	Karmeli	5,522,551 A	6/1996	DeFrank
4,824,019 A	4/1989	Lew	5,531,381 A	7/1996	Ruttenberg
4,824,025 A	4/1989	Miller	5,535,778 A	7/1996	Zakai
4,850,531 A	7/1989	Littleton	5,584,952 A	12/1996	Rubenstein
4,854,158 A	8/1989	Gates	5,586,727 A	12/1996	Shekalim
4,856,552 A	8/1989	Hiemstra	5,591,293 A	1/1997	Miller
4,859,264 A	8/1989	Buluschek	5,601,381 A	2/1997	Hadar
4,862,731 A	9/1989	Gates	5,609,303 A	3/1997	Cohen
4,874,132 A	10/1989	Gilead	5,615,833 A	4/1997	Robillard
4,880,167 A	11/1989	Langa	5,615,838 A	4/1997	Eckstein
4,900,437 A	2/1990	Savall	5,620,143 A	4/1997	Delmer
4,909,411 A	3/1990	Uchida	5,628,462 A	5/1997	Miller
4,935,992 A	6/1990	Due	5,634,594 A	6/1997	Cohen
4,948,295 A	8/1990	Pramsoler	5,636,797 A	6/1997	Cohen
4,984,739 A	1/1991	Allport	5,641,113 A	6/1997	Somaki
4,990,256 A	2/1991	Schmidt	5,651,999 A	7/1997	Armentrout
5,022,940 A	6/1991	Mehoudar	5,673,852 A	10/1997	Roberts
5,031,837 A	7/1991	Hanish	5,676,897 A	10/1997	Dermitzakis
5,040,770 A	8/1991	Rajster	5,695,127 A	12/1997	Delmer
5,052,625 A	10/1991	Ruskin	5,711,482 A	1/1998	Yu
5,096,206 A	3/1992	Andre	5,722,601 A	3/1998	DeFrank
5,106,021 A	4/1992	Gilead	5,727,733 A	3/1998	Ruttenberg
5,111,995 A	5/1992	Dumitrascu	5,732,887 A	3/1998	Roberts
5,111,996 A	5/1992	Eckstein	5,744,423 A	4/1998	Voris
5,116,414 A	5/1992	Burton	5,744,779 A	4/1998	Buluschek
5,118,042 A	6/1992	Delmer	RE35,857 E	7/1998	Mehoudar
5,118,215 A	6/1992	Freier	5,785,785 A	7/1998	Delmer
5,122,044 A	6/1992	Mehoudar	5,813,603 A	9/1998	Kurtz
5,123,984 A	6/1992	Allport	5,820,028 A	10/1998	Dinur
5,137,216 A	8/1992	Hanish	5,820,029 A	10/1998	Marans
5,141,360 A	8/1992	Zeman	5,829,685 A	11/1998	Cohen
5,163,622 A	11/1992	Cohen	5,829,686 A	11/1998	Cohen
5,181,952 A	1/1993	Burton	5,855,324 A	1/1999	DeFrank
5,183,208 A	2/1993	Cohen	5,865,377 A	2/1999	DeFrank
5,192,027 A	3/1993	Delmer	5,871,325 A	2/1999	Schmidt
5,200,132 A	4/1993	Shfaram	5,875,815 A	3/1999	Ungerecht
5,203,503 A	4/1993	Cohen	5,898,019 A	4/1999	Van Voris
5,207,386 A	5/1993	Mehoudar	5,944,260 A	8/1999	Wang
5,216,784 A	6/1993	Dyer	5,957,391 A	9/1999	DeFrank
5,232,159 A	8/1993	Abbate	5,972,375 A	10/1999	Truter
5,232,160 A	8/1993	Hendrickson	5,988,211 A	11/1999	Cornell
5,236,130 A	8/1993	Hadar	5,996,909 A	12/1999	Lin
5,246,171 A	9/1993	Roberts	6,015,102 A	1/2000	Daigle
5,252,162 A	10/1993	Delmer	6,026,850 A	2/2000	Newton
5,253,807 A	10/1993	Newbegin	6,027,048 A	2/2000	Mehoudar
5,271,786 A	12/1993	Gorney	6,039,270 A	3/2000	Dermitzakis
5,279,462 A	1/1994	Mehoudar	6,062,245 A	5/2000	Berglind
5,282,578 A	2/1994	De Frank	6,095,185 A	8/2000	Rosenberg
5,282,916 A	2/1994	Bloom	6,109,296 A	8/2000	Austin
5,283,916 A	2/1994	Haro	6,116,523 A	9/2000	Cabahug
5,294,058 A	3/1994	Einav	6,120,634 A	9/2000	Harrold
5,310,438 A	5/1994	Ruskin	6,164,605 A	12/2000	Drake
5,314,116 A	5/1994	Krauth	6,179,949 B1	1/2001	Buluschek
5,316,220 A	5/1994	Dinur	6,180,162 B1	1/2001	Shigeru
5,318,657 A	6/1994	Roberts	6,206,305 B1	3/2001	Mehoudar
5,324,371 A	6/1994	Mehoudar	6,213,408 B1	4/2001	Shekalim
5,324,379 A	6/1994	Eckstein	6,238,081 B1	5/2001	Sand
5,327,941 A	7/1994	Bitsakis	6,250,571 B1	6/2001	Cohen
5,330,107 A	7/1994	Karathanos	6,280,554 B1	8/2001	Lambert
5,332,160 A	7/1994	Ruskin	6,302,338 B1	10/2001	Cohen
5,333,793 A	8/1994	DeFrank	6,308,768 B1	10/2001	Rice
5,337,597 A	8/1994	Peake	6,308,902 B1	10/2001	Huntley
5,340,027 A	8/1994	Yu	D450,550 S	11/2001	Roberts
5,353,993 A	10/1994	Rosenberg	6,334,958 B1	1/2002	Ruskin
5,364,032 A	11/1994	De Frank	6,343,616 B1	2/2002	Houtchens
5,399,160 A	3/1995	Dunberger	D455,055 S	4/2002	Roberts
5,400,967 A	3/1995	Yu	6,371,390 B1	4/2002	Cohen
5,400,973 A	3/1995	Cohen	6,382,530 B1	5/2002	Perkins
			6,394,412 B2	5/2002	Zakai
			6,403,013 B1	6/2002	Man
			6,449,872 B1	9/2002	Olku
			6,460,786 B1	10/2002	Roberts

(56)

References Cited

U.S. PATENT DOCUMENTS

6,461,468 B1	10/2002	Cohen	8,141,589 B2	3/2012	Socolsky
6,461,486 B2	10/2002	Lorincz	D657,638 S	4/2012	Einav
6,464,152 B1	10/2002	Bolinis	8,220,727 B2	7/2012	Lee
6,499,687 B2	12/2002	Bryant	8,267,115 B2	9/2012	Giuffre'
6,499,872 B2	12/2002	Sand	8,286,667 B2	10/2012	Ruskin
6,513,734 B2	2/2003	Bertolotti	8,302,887 B2	11/2012	Park
6,543,509 B1	4/2003	Harrold	8,317,111 B2	11/2012	Cohen
6,557,819 B2	5/2003	Austin	8,372,326 B2	2/2013	Mamo
6,561,443 B2	5/2003	Delmer	8,381,437 B2	2/2013	Ciudaj
6,568,607 B2	5/2003	Boswell	8,439,282 B2	5/2013	Allen
6,581,262 B1	6/2003	Myers	8,454,786 B2	6/2013	Guichard
6,581,854 B2	6/2003	Eckstein	8,469,294 B2	6/2013	Mata
6,581,902 B2	6/2003	Michau	8,475,617 B2	7/2013	Kertscher
6,620,278 B1	9/2003	Harrold	8,511,585 B2	8/2013	Keren
6,622,427 B2	9/2003	Breitner	8,511,586 B2	8/2013	Einav
6,622,946 B2	9/2003	Held	8,584,398 B2	11/2013	Gesser
6,691,739 B2	2/2004	Rosenberg	8,628,032 B2	1/2014	Feith
6,736,337 B2	5/2004	Vildibill	8,663,525 B2	3/2014	Mamo
6,750,760 B2	6/2004	Albritton	8,689,484 B2	4/2014	Ruskin
6,764,029 B2	7/2004	Rosenberg	8,714,181 B2	5/2014	Shani
6,817,548 B2	11/2004	Krauth	8,714,205 B2	5/2014	Loebinger
6,821,928 B2	11/2004	Ruskin	8,763,934 B2	7/2014	Patel
6,827,298 B2	12/2004	Sacks	8,770,888 B2	7/2014	Helbig
6,830,203 B2	12/2004	Neyestani	8,870,098 B2	10/2014	Lutzki
6,875,491 B2	4/2005	Miyamoto	8,882,004 B2	11/2014	Gorney
6,886,761 B2	5/2005	Cohen	8,998,112 B2	4/2015	Cohen
6,894,250 B2	5/2005	Kertscher	8,998,113 B2	4/2015	Keren
6,896,758 B1	5/2005	Giuffre'	9,022,059 B2	5/2015	Cohen
6,920,907 B2	7/2005	Harrold	9,022,764 B2	5/2015	Wisler
6,933,337 B2	8/2005	Lang	9,027,856 B2	5/2015	DeFrank
6,936,126 B2	8/2005	DeFrank	D740,940 S	10/2015	Fregoso
6,945,476 B2	9/2005	Giuffre	9,192,108 B2	11/2015	Kertscher
6,996,932 B2	2/2006	Kruer	9,253,950 B1	2/2016	Clark
6,997,402 B2	2/2006	Kruer	9,253,951 B2	2/2016	Herrera
7,007,916 B2	3/2006	Lee	9,258,949 B2	2/2016	Nourian
7,048,010 B2	5/2006	Golan	9,258,950 B2	2/2016	Kidachi
7,108,205 B1	9/2006	Hashimshony	9,291,276 B2	3/2016	Keren
7,175,113 B2	2/2007	Cohen	9,345,205 B2	5/2016	Kidachi
7,241,825 B2	7/2007	Koga	9,380,749 B2	7/2016	Akritanakis
7,270,280 B2	9/2007	Belford	9,386,752 B2	7/2016	Einav
7,284,302 B2	10/2007	Lares	9,433,157 B2	9/2016	Dermitzakis
7,300,004 B2	11/2007	Sinden	9,439,366 B2	9/2016	Kidachi
7,363,938 B1	4/2008	Newton	9,485,923 B2	11/2016	Ensworth
7,392,614 B2	7/2008	Kruer	D781,115 S	3/2017	Einav
7,410,108 B2	8/2008	Rabinowitz	9,695,965 B2	7/2017	Hadas
7,445,021 B2	11/2008	Newton	9,814,189 B1	11/2017	Clark
7,445,168 B2	11/2008	Ruskin	9,872,444 B2	1/2018	Turk
7,455,094 B2	11/2008	Lee	9,877,440 B2	1/2018	Ensworth
7,506,658 B2	3/2009	Guest	9,877,441 B2	1/2018	Ensworth
7,530,382 B2	5/2009	Kertscher	9,877,442 B2	1/2018	Kim
7,648,085 B2	1/2010	Mavrakis	D811,179 S	2/2018	Ensworth
7,681,805 B2	3/2010	Belford	9,883,640 B2 *	2/2018	Zakarian ..... A01G 25/026
7,681,810 B2	3/2010	Keren	9,894,851 B2	2/2018	Desarzens
7,695,587 B2	4/2010	Kertscher	9,949,448 B2	4/2018	Cohen
7,712,253 B2	5/2010	Gesser	D816,439 S	5/2018	Crook
7,735,758 B2	6/2010	Cohen	10,010,030 B2	7/2018	Motha
7,748,930 B2	7/2010	Gesser	10,034,439 B2	7/2018	Kidachi
7,775,237 B2	8/2010	Keren	D826,662 S *	8/2018	Ensworth ..... D8/1
7,802,592 B2	9/2010	McCarty	10,070,595 B2	9/2018	Loebinger
7,887,664 B1	2/2011	Mata	10,085,391 B2	10/2018	Haub
7,900,656 B2	3/2011	Masarwa	10,107,707 B2	10/2018	Defrank
7,913,935 B2	3/2011	Einav	10,172,302 B2	1/2019	Keren
7,954,732 B2	6/2011	Shekalim	10,212,896 B2	2/2019	Kidachi
7,988,076 B2	8/2011	Mamo	10,271,484 B2	4/2019	Einav
7,989,076 B2	8/2011	Li	10,299,444 B2	5/2019	Cohen
8,002,496 B2	8/2011	Giuffre	10,330,559 B2 *	6/2019	Edris ..... G01M 3/28
8,011,852 B2	9/2011	Gesser	10,349,587 B2	7/2019	Einav
8,033,300 B2	10/2011	McCarty	10,375,904 B2	8/2019	Ensworth
D648,191 S	11/2011	Thayer	10,455,780 B2	10/2019	Cohen
8,051,871 B2	11/2011	Shani	10,462,983 B2	11/2019	Socolsky
8,079,385 B2	12/2011	Hatton	2002/0064935 A1	5/2002	Honda
8,091,276 B2	1/2012	Gesser	2002/0070297 A1	6/2002	Bolinis
8,091,800 B2	1/2012	Retter	2002/0074434 A1	6/2002	Delmer
8,096,491 B2	1/2012	Lutzki	2002/0088877 A1	7/2002	Bertolotti
8,136,246 B2	3/2012	So	2002/0104902 A1	8/2002	Eckstein
			2002/0104903 A1	8/2002	Eckstein
			2002/0113147 A1	8/2002	Huntley
			2003/0029937 A1	2/2003	Dermitzakis
			2003/0042335 A1	3/2003	Krauth

(56)

References Cited

U.S. PATENT DOCUMENTS

2003/0050372	A1	3/2003	Stanhope	2011/0226354	A1	9/2011	Thordarson
2003/0057301	A1	3/2003	Cohen	2012/0012678	A1	1/2012	Gregory
2003/0089409	A1	5/2003	Morimoto	2012/0012682	A1	1/2012	Einav
2003/0089803	A1	5/2003	Huntley	2012/0074345	A1	3/2012	Hatton
2003/0090369	A1	5/2003	Albritton	2012/0097196	A1	4/2012	Cohen
2003/0092808	A1	5/2003	Stanhope	2012/0097254	A1	4/2012	Cohen
2003/0140977	A1	7/2003	Berton	2012/0097769	A1	4/2012	Zavoli
2003/0150940	A1	8/2003	Vildibill	2012/0104648	A1	5/2012	Yiflach
2003/0226913	A1	12/2003	Brunnengraeber	2012/0126036	A1	5/2012	Patel
2004/0018263	A1	1/2004	Hashimshony	2012/0180875	A1	7/2012	Keller
2004/0164185	A1	8/2004	Giuffre	2012/0199673	A1	8/2012	Cohen
2005/0029231	A1	2/2005	Kertscher	2012/0256017	A1	10/2012	Gorney
2005/0077396	A1	4/2005	Rabinowitz	2012/0267454	A1	10/2012	Einav
2005/0103409	A1	5/2005	Weber	2012/0305676	A1	12/2012	Keren
2005/0133613	A1	6/2005	Mayer	2013/0181066	A1	7/2013	Dermitzakis
2005/0224607	A1	10/2005	Dinur	2013/0248616	A1	9/2013	Ensworth
2005/0224962	A1	10/2005	Akamatsu	2013/0248622	A1	9/2013	Kim
2005/0258278	A1	11/2005	Cohen	2013/0341431	A1	12/2013	Ensworth
2005/0258279	A1	11/2005	Harrold	2014/0027539	A1	1/2014	Kim
2005/0279856	A1	12/2005	Nalbandian	2014/0034753	A1	2/2014	Mavrakis
2005/0279866	A1	12/2005	Belford	2014/0110506	A1	4/2014	Mavrakis
2005/0284966	A1	12/2005	DeFrank	2014/0246520	A1	9/2014	Einav
2006/0032949	A1	2/2006	Lo	2014/0263758	A1	9/2014	Turk
2006/0043219	A1	3/2006	Raanan	2015/0014446	A1	1/2015	Cohen
2006/0144965	A1	7/2006	Keren	2015/0041563	A1	2/2015	Ensworth
2006/0163388	A1	7/2006	Mari	2015/0041564	A1	2/2015	Ensworth
2006/0169805	A1	8/2006	Dabir	2015/0090815	A1	4/2015	Akritanakis
2006/0186228	A1	8/2006	Belford	2015/0090816	A1	4/2015	Akritanakis
2006/0202381	A1	9/2006	Bach	2015/0107777	A1	4/2015	Zakarian
2006/0237561	A1	10/2006	Park	2015/0144717	A1	5/2015	Turk
2006/0255186	A1	11/2006	Ruskin	2015/0181816	A1	7/2015	Desarzens
2007/0095950	A1	5/2007	Kim	2015/0181820	A1	7/2015	Crook
2007/0108318	A1	5/2007	Mamo	2015/0201568	A1	7/2015	Einav
2007/0138323	A1	6/2007	Lee	2015/0223414	A1	8/2015	Kidachi
2007/0175580	A1	8/2007	Mata	2015/0250111	A1	9/2015	Kidachi
2007/0187031	A1	8/2007	Kertscher	2015/0296723	A1	10/2015	Jain
2007/0194149	A1	8/2007	Mavrakis	2015/0319940	A1	11/2015	Kidachi
2008/0041978	A1	2/2008	Keren	2015/0351333	A1	12/2015	Eberle
2008/0067266	A1	3/2008	Cohen	2016/0057947	A1	3/2016	Ensworth
2008/0099584	A1	5/2008	Raanan	2016/0075070	A1	3/2016	Verelis
2008/0105768	A1	5/2008	Kertscher	2016/0076965	A1	3/2016	Edris
2008/0190256	A1	8/2008	So	2016/0088806	A1	3/2016	Haub
2008/0237374	A1	10/2008	Belford	2016/0095285	A1	4/2016	Loebinger
2008/0257991	A1	10/2008	Einav	2016/0198643	A1	7/2016	Cohen
2008/0265064	A1	10/2008	Keren	2016/0219802	A1	8/2016	Ensworth
2009/0020634	A1	1/2009	Schweitzer	2016/0219803	A1	8/2016	Keren
2009/0065084	A1	3/2009	Masarwa	2016/0223092	A1	8/2016	Hadas
2009/0145985	A1	6/2009	Mayer	2016/0278311	A1	9/2016	Kidachi
2009/0159726	A1	6/2009	Thompson	2016/0286741	A1	10/2016	Kidachi
2009/0165879	A1	7/2009	Socolsky	2016/0286743	A1	10/2016	Einav
2009/0173811	A1	7/2009	Gorney	2016/0309669	A1	10/2016	Kidachi
2009/0243146	A1	10/2009	Retter	2016/0330917	A1	11/2016	Kidachi
2009/0261183	A1	10/2009	Mavrakis	2017/0035005	A1	2/2017	Kidachi
2009/0266919	A1	10/2009	Mavrakis	2017/0035006	A1	2/2017	Kim
2009/0283613	A1	11/2009	Barkai	2017/0112078	A1	4/2017	Ensworth
2009/0302127	A1	12/2009	Lutzki	2017/0118927	A1	5/2017	Loebinger
2009/0314377	A1	12/2009	Giuffre	2017/0142916	A1	5/2017	Shamshery
2009/0320932	A1	12/2009	Giuffre	2017/0205013	A1	7/2017	Smith
2010/0000674	A1	1/2010	Voigtmann	2017/0290277	A1	10/2017	Cohen
2010/0023717	A1	1/2010	Jinno	2017/0292646	A1	10/2017	Hadas
2010/0096478	A1	4/2010	Mamo	2018/0014477	A1*	1/2018	Ensworth ..... A01G 25/026
2010/0096479	A1	4/2010	Mamo	2018/0027756	A1	2/2018	Kidachi
2010/0108785	A1	5/2010	Lee	2018/0098514	A1	4/2018	Socolsky
2010/0126974	A1	5/2010	Kertscher	2018/0110191	A1	4/2018	Keren
2010/0155508	A1	6/2010	Keren	2018/0116134	A1	5/2018	Ensworth
2010/0163651	A1	7/2010	Feith	2018/0168116	A1	6/2018	Morikoshi
2010/0175408	A1	7/2010	Korda	2018/0168117	A1	6/2018	Noguchi
2010/0219265	A1	9/2010	Feld	2018/0177145	A1	6/2018	Morikoshi
2010/0237170	A1	9/2010	Rosenberg	2018/0199524	A1	7/2018	Socolsky
2010/0244315	A1	9/2010	Mamo	2018/0213732	A1*	8/2018	Ensworth ..... A01G 25/023
2010/0252126	A1	10/2010	Roes	2018/0228097	A1	8/2018	Alkalay
2010/0252127	A1	10/2010	Gross	2018/0266576	A1	9/2018	Balet
2010/0282873	A1	11/2010	Mattlin	2018/0317406	A1	11/2018	Tsouri
2010/0319784	A1	12/2010	Kuhne	2018/0328498	A1	11/2018	Rulli
2011/0186652	A1	8/2011	Cohen	2018/0338434	A1	11/2018	Wlassich
				2018/0359962	A1	12/2018	Noguchi
				2019/0246577	A1	8/2019	Masarwake

(56)

References Cited

U.S. PATENT DOCUMENTS

2019/0246578 A1 8/2019 Einav  
2019/0335687 A1 11/2019 Socolsky

FOREIGN PATENT DOCUMENTS

CA 1053726 5/1979  
CN 1627994 6/2005  
CN 102057823 5/2011  
CN 201821716 5/2011  
CN 201871438 6/2011  
CN 202617872 12/2012  
CN 102933071 2/2013  
DE 112706 5/1975  
DE 3525591 1/1986  
EP 0160299 A2 11/1985  
EP 0344605 A2 12/1989  
EP 0444425 A1 9/1991  
EP 0480632 A2 4/1992  
EP 0491115 A1 6/1992  
EP 0549515 A1 6/1993  
EP 636309 A1 2/1995  
EP 0709020 A1 5/1996  
EP 0730822 A2 9/1996  
EP 493299 5/1997  
EP 0872172 A1 10/1998  
EP 1541013 A2 6/2005  
EP 1701147 9/2006  
EP 2952091 A1 12/2015  
FR 2366790 5/1978  
GB 1498545 1/1978  
GB 2057960 A 4/1981  
IL 42705 A 3/1976  
IL 53463 A 3/1983  
IL 97564 A 7/1996  
IL 221089 5/2016  
IL 212105 7/2016  
IT 1255120 10/1995  
JP 2000228417 8/2000  
JP 2016220620 A 12/2016  
RU 2240682 1/2005  
RU 2275791 3/2006  
RU 2415565 4/2011  
WO 9205689 A1 4/1992  
WO 9221228 A1 12/1992  
WO 9427728 A1 12/1994  
WO 1995029761 11/1995  
WO 9614939 5/1996  
WO 9810635 A1 3/1998  
WO 9902273 A1 1/1999  
WO 9918771 A1 4/1999  
WO 9955141 A1 11/1999  
WO 0001219 A1 1/2000  
WO 0010378 A1 3/2000  
WO 030760 6/2000  
WO 136106 A1 5/2001  
WO 0156768 A1 8/2001  
WO 2001064019 9/2001  
WO 0204130 A1 1/2002  
WO 2002015670 2/2002  
WO 2003045577 A1 6/2003  
WO 2003066228 A1 8/2003  
WO 2004028778 A1 4/2004  
WO 2007046105 10/2005  
WO 2006030419 A2 3/2006  
WO 2006038246 4/2006  
WO 2007068523 A1 6/2007  
WO 2010022471 3/2010  
WO 2010048063 4/2010  
WO 2011092557 8/2011  
WO 2011101842 8/2011  
WO 2012015655 A1 2/2012  
WO 2012137200 10/2012  
WO 2013148672 10/2013  
WO 2013155173 A2 10/2013  
WO 2013192321 12/2013

WO 2014016832 1/2014  
WO 2015023624 2/2015  
WO 2015044801 4/2015  
WO 2015052107 4/2015  
WO 2015098412 7/2015  
WO 2016156814 10/2016  
WO 2018078521 5/2018

OTHER PUBLICATIONS

USPTO; U.S. Appl. No. 13/964,903; Notice of Allowance dated Sep. 26, 2018; (pp. 1-5).  
USPTO; U.S. Appl. No. 14/036,881; Notice of Allowance dated Aug. 30, 2018; (pp. 1-6).  
USPTO; U.S. Appl. No. 14/851,545; Office Action dated Oct. 29, 2018; (pp. 1-32).  
USPTO; U.S. Appl. No. 14/910,573; Office Action dated Sep. 26, 2018; (pp. 1-11).  
USPTO; U.S. Appl. No. 15/650,379; Notice of Allowance dated Oct. 24, 2018; (pp. 1-7).  
Dixieline Lumber & Home Centers Catalog, DIG Irrigation Products Drip Tubing, 2003, p. 13.  
Eurodrip U.S.A., Inc., 2009 Irrigation Products Catalog, p. 4-5, 4 pages.  
Eurodrip U.S.A., Inc., Products Guide, copyright date Nov. 2007, 2 pages.  
Hunter Industries, Drip Design Guide, Dec. 2012, 32 pages.  
Jain Irrigation Inc., 2009 Product Catalog, pp. 12-13, copyright date 2009 (revised Oct. 2008), 4 pages.  
metzerplas.com, OEM Drippers, Sep. 29, 2013, [online]. Retrieved from the Internet via the Internet Archive: Wayback Machine: <URL: <http://metzerplas.com/en-US/48/865/>> on Dec. 10, 2018, 2 pages.  
NDS Inc., AGRIFIM Drip and Micro Irrigation Catalog, Jan. 2004, 3 pages.  
NETAFIM USA, Landscape & Turf Division Product Catalog, Aug. 2004, 36 pages.  
NETAFIM, RAM Pressure Compensating Dripperline brochure, Feb. 1997, 4 pages.  
Photographs of an in-line cylindrical drip emitter on sale or publicly disclosed more than a year before the filing of the instant application, 2 pages.  
Rain Bird Corporation, Rain Bird PC Dripline brochure, copyright date Nov. 2000, 12 pages.  
Rain Bird® Consumer Products Catalog, Tubing, D33305-11, copyright date 2010, p. 48.  
Rain Bird® Landscape Irrigation Products 1997-1998 Catalog, Component and Emmission Device, D48301, copyright date Aug. 1997, pp. 128-129.  
Rain Bird® Landscape Irrigation Products 1999-2000 Catalog, Emission Devices, D37200, copyright date Aug. 1998, pp. 136-137.  
Rain Bird® Landscape Irrigation Products 2004 New Products Catalog, D37200D, copyright date Oct. 2003, pp. 41-42.  
Rain Bird® Landscape Irrigation Products 2008-2009 Catalog, D37200H, copyright date Sep. 2007, pp. 180-187.  
Rain Bird® Landscape Irrigation Products, Rain Bird Dripline Series, RBE-03-TE-10, copyright date Aug. 2003, pp. 106-107.  
Rain Bird® Nursery Equipment Catalog 1986-1987, D32304, copyright date 1986, p. 13.  
Rain Bird® XF Series Dripline | Design, Installation and Maintenance Guide, D40024A, copyright date Feb. 2012, 48 pages.  
Rain Bird® XFCV Dripline with Heavy-Duty Check Valve, D40215, copyright date Oct. 2012, 2 pages.  
Rain Bird® XFD Dripline with Greater Flexibility, D39994B, copyright date Jan. 2012, 2 pages.  
Rain Bird® XFS Dripline with Copper Shield™ Technology, D39978B, copyright date Jan. 2012, 2 pages.  
Rain Tape Design Guide, Rain Bird®, D35252, document was published more than a year before the filing date of the instant application, 5 pages.  
Siplast/Irritec Multibar Pressure Compensated Coextruded Dripline, Jul. 22, 2005, 4 pages.

(56)

**References Cited**

## OTHER PUBLICATIONS

The Toro Company, 2000-2001 Irrigation Products Catalog, p. 28, copyright date Oct. 1999, 3 pages.

The Toro Company, Drip in Classic Turbulent Flow Dripline brochure, Jun. 2014, 4 pages.

The Toro Company, Drip in PC Brown Dripline brochure, 2015, 2 pages.

DIG® Irrigation Product Catalog, <www.digcorp.com>, 2018, 72 pages.

DIG® Irrigation Product Catalog, <www.digcorp.com>, 2012, 32 pages.

DIG® Irrigation Product Catalog, <www.digcorp.com>, 2016, 72 pages.

Irritec® on Line Drippers iDrop®, Irritec S.p.A., <www.irritec.com>, available prior to May 15, 2017, 2 pages.

Irritec® Product Catalog and Price List, Irritec USA Inc., <www.irritec.com>, 2016, 66 pages.

Irritec™ USA iDrop™ PCDS, Irritec USA Inc., <www.irritecusa.com>, available prior to May 15, 2017, 2 pages.

Jain® Button Emitters, Jain Irrigation Inc., <www.jainsusa.com>, available prior to May 15, 2017, 2 pages.

Jain® Emission Devices, Jain Irrigation Systems Ltd., <www.jainsusa.com>, available prior to May 15, 2017, pp. 171-182.

Jain® Landscape Catalog, Jain Irrigation, Inc., <www.jainsusa.com>, 2016, 102 pages.

Jain® Online Emitters, Jain Irrigation Systems Ltd., <www.jainsusa.com>, available prior to May 15, 2017, 2 pages.

Netafim™ Non-Pressure Compensating Drippers, Netafim USA, <www.netafimusa.com>, available prior to May 15, 2017, 2 pages.

Netafim™ Point Source Emitters, Netafim USA <www.netafimusa.com>, available prior to May 15, 2017, 4 pages.

Netafim™ Pressure Compensating (PC) Spray Stakes, Netafim USA, <www.netafimusa.com>, as of Apr. 2016, 12 pages.

Netafim™ Pressure Compensating Drippers, Netafim USA, <www.netafimusa.com>, Apr. 2016, 2 pages.

Netafim™ Pressure Compensating Drippers, Netafim USA, <www.netafimusa.com>, Jun. 2018, 2 pages.

Photograph of DIG® Product No. PCA-003CV, available prior to May 15, 2017, 1 page.

Photograph of Irritec® Product No. A6-WPC2BB, available prior to May 15, 2017, 1 page.

Photograph of Irritec® Product No. A6-WPC3BB, available prior to May 15, 2017, 1 page.

Photograph of Jain® Product No. CTTPC2-CNL, available prior to May 15, 2017, 1 page.

Photograph of Jain® Product No. CTTPC4-CNL, available prior to May 15, 2017, 1 page.

Photograph of Netafim™ Product No. SPCV10, available prior to May 15, 2017, 1 page.

Photograph of Netafim™ Product No. Techflow Emitter WPC20, available prior to May 15, 2017, 1 page.

Photograph of Netafim™ Product No. WPC10, available prior to May 15, 2017, 1 page.

Photograph of Netafim™ Woodpecker Junior Product No. 01WPCJL4, available prior to May 15, 2017, 1 page.

Photograph of Toro® Product No. A6-WPC2BB, available prior to May 15, 2017, 1 page.

Price Book, Oct. 2015, Rivulis Irrigation, Oct. 2015 (Revised Apr. 2016), <rivulis.com>, 116 pages.

Toro® NGE® AL Anti-Drain Pressure Compensating Emitter, The Toro Company, <www.toro.com>, 2012, 2 pages.

Toro® NGE® Emitters, the Toro Company, <www.toro.com>, 2018, 2 pages.

Toro® NGE® New Generation Emitters, The Toro Company, <www.toro.com>, 2013, 2 pages.

Toro® NGE® SF Self-flushing Pressure Compensating Emitter, The Toro Company, <www.toro.com>, 2012, 2 pages.

Toro® Turbo-SC® Plus Pressure-compensating Emitter, The Toro Company, <www.toro.com>, 2009, 2 pages.

State Intellectual Property Office of People'S Republic of China, First Office Action issued in Application No. 201480045002.0, dated Apr. 16, 2018, 20 pp.

USPTO; U.S. Appl. No. 14/036,881; Notice of Allowance dated May 9, 2018 (pp. 1-5).

USPTO; U.S. Appl. No. 13/964,903; Notice of Allowance dated Mar. 26, 2019; (pp. 1-5).

USPTO; U.S. Appl. No. 15/650,379; Notice of Allowance dated Mar. 26, 2019; (pp. 1-5).

USPTO; U.S. Appl. No. 15/595,427; Office Action dated Apr. 4, 2019; (pp. 1-6).

USPTO; U.S. Appl. No. 14/851,545; Notice of Allowance dated Apr. 17, 2019; (pp. 1-9).

USPTO; U.S. Appl. No. 14/910,573; Office Action dated May 6, 2019; (pp. 1-11).

USPTO; U.S. Appl. No. 15/650,379; Notice of Allowance dated Feb. 19, 2019; (pp. 1-5).

Brazilian Patent and Trademark Office, Search Report dated Nov. 19, 2018 for Brazilian Patent Application No. BR 11 2014 023843-0, 2 pages.

Brazilian Patent and Trademark Office, Technical Examination Report dated Nov. 19, 2018 for Brazilian Patent Application No. BR 11 2014 023843-0, 9 pages.

CETESB and Sindiplast, Environmental Guide of the Plastic Materials Recycling and Processing Industry [electronic resource], Technical elaboration: Gilmer do Amaral et al., Collaborators: Andre H.C. Botto e Souza et al., 2011. Retrieved from the Internet: <URL: http://file.sindiplast.org.br/download/guia\_ambiental\_internet.pdf>, 91 pages.

USPTO; U.S. Appl. No. 13/964,903; Notice of Allowance dated Dec. 14, 2018; (pp. 1-5).

USPTO; U.S. Appl. No. 15/595,427; Office Action dated Dec. 17, 2018; (pp. 1-6).

ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, K. Taylor et al, "A Mathematical Model For Pressure Compensating Emitters", Aug. 2-5, 2015, Boston, Massachusetts, USA, 10 pp. http://aasystems.eu/dripper/; Advanced Automation Systems Ltd., Dec. 18, 2015, 12 pp.

USPTO; U.S. Appl. No. 13/964,903; Notice of Allowance dated Apr. 5, 2018 (pp. 1-5).

European Patent Office, Communication Pursuant to Article 94(3) EPC issued in European Application No. 13 768 209.2, Jan. 4, 2019, 5 pp.

Lady Bug Emitter, Rain Bird Sales, Inc., <https://web.archive.org/web/19980121011011/http://www.rainbird.com:80/rbturf/products/xeri/emission/ladybug.htm>, dated Dec. 1997, 2 pages.

Multi-Outlet Xeri-Bug™, Rain Bird Sales, Inc., <https://web.archive.org/web/19980121010952/http://www.rainbird.com:80/rbturf/products/xeri/emission/moutlet.htm>, 1997, 2 pages.

Photograph of Toro® Product No. DPC08-MA-Red, Jun. 22, 2012, 1 page.

Pressure-Compensating Modules, Rain Bird Sales, Inc., <https://web.archive.org/web/19980121011024/http://www.rainbird.com:80/rbturf/products/xeri/emission/prescmp.htm>, 1997, 2 pages.

Rain Bird Multi-Outlet Xeri-Bug, 1998, 1 page.

Rain Bird Pressure-Compensating Module, 1998, 1 page.

Rain Bird Xeri-Bug, 1998, 3 pages.

Patent Cooperation Treaty, International Searching Authority, Notification of Transmittal of the International Search Report and the Written Opinion of the International Searching Authority, or the Declaration, issued in International Application No. PCT/US2018/015516, Jun. 28, 2018, 8 pp.

USPTO; U.S. Appl. No. 15/853,135; Notice of Allowance dated May 20, 2019; (pp. 1-10).

USPTO; U.S. Appl. No. 15/595,427; Office Action dated Jun. 6, 2019; (pp. 1-5).

USPTO; U.S. Appl. No. 14/036,881; Corrected Notice of Allowability dated May 21, 2018 (pp. 1-2).

USPTO; U.S. Appl. No. 15/650,379; Office Action dated May 18, 2018 (pp. 1-8).

USPTO; U.S. Appl. No. 14/851,545; Office Action dated Jul. 3, 2018; (pp. 1-29).

(56)

## References Cited

## OTHER PUBLICATIONS

- Alam, M., et al., "Subsurface Drip Irrigation for Alfalfa," Kansas State University, 2009, pp. 1-8.
- Alapati, Nanda K., Netafim Letter dated Mar. 30, 2012 with enclosure and attachments, 13 pages.
- Alapati, Nanda K., Netafim Letter dated Mar. 30, 2012 with enclosure, 6 pages.
- Arduini, I., et al., "Influence of Copper on Root Growth and Morphology of Pinus Pinea L. and Pinus Pinaster Ait. Seedlings," *Tree Physiology*, 15, 1995, pp. 411-415.
- Bernard, H., et al., "Assessment of herbicide leaching risk in two tropical soils of Reunion Island (France)," *J Environ Qual* 34:534-543, (2005).
- Beverage, K., "Drip Irrigation for Row Crops," New Mexico State University, 2001, pp. 1-43.
- Borkow, G., et al., "A Novel Anti-Influenza Copper Oxide Containing Respiratory Face Mask," *PLoS ONE*, www.plosone.org, Jun. 2010, vol. 5, Issue 6, pp. 1-8.
- Borkow, G., et al., "Copper as a Biocidal Tool," *Current Medicinal Chemistry*, 2005, 12, 2163-2175.
- Borkow, G., et al., "Endowing Textiles with Permanent Potent Biocidal Properties by Impregnating Them with Copper Oxide," *ResearchGate*, Jan. 2006.
- Borkow, G., et al., "Putting copper into action:copperimpregnated products with potent biocidal activities," *FASEB J*, 18:1728-1730, (2004).
- Coder, K., "Tree Root Growth Control Series: Root Control Barriers," The University of Georgia, Mar. 1998, pp. 1-7.
- Crawford, M., "Copper-Coated Containers and Their Impact on the Environment," *Spin Out*, 2003, pp. 76-78.
- Crawford, M., "Update on Copper Root Control," *Spin Out*, 1997.
- Diver, S., et al., "Sustainable Small-Scale Nursery Production," *ATTRA*, Nov. 2001, pp. 1-31.
- Duke, K., et al., "Sewer Line Chemical Root Control with Emphasis on Foaming Methods Using Metam-Sodium and Dichlobenil," EPA United States Environmental Protection Agency, Sep. 1995.
- Eason, Audra, et al., "Integrated modeling environment for state-wide assessment of groundwater vulnerability from pesticide use in agriculture," *Pest Manag Sci*, 60:739-745 (online:2004).
- European Patent Office, Communication Pursuant to Article 94(3) EPC issued in European Application No. 14 836 360.9, dated Feb. 8, 2017, 7 pp.
- European Patent Office, Extended European Search Report for European Application No. 13770084.5 dated Feb. 11, 2016, 7 pages.
- European Patent Office, Extended European Search Report issued in Application No. 13768209.2, dated Nov. 24, 2015, 10 pp.
- European Patent Office, Office Action for European Application No. 10160675.4 dated Mar. 27, 2012, 2 pp.
- European Patent Office, Search Report for European Application No. 10160675.4 dated Aug. 6, 2010, 2 pp.
- Final Office Action dated Aug. 25, 2015; U.S. Appl. No. 13/430,308; 11 pages.
- Final Office Action dated Jul. 21, 2016; U.S. Appl. No. 13/430,308; 9 pages.
- Fitch, Even, Tabin & Flannery; Letter, Apr. 23, 2008, 1 p.
- Giles-Parker, C, EPA, Pesticide Fact Sheet, pp. 1-4.  
<http://aasystems.eu/products11.html>; Advanced Automation Systems Ltd. (1 p., dated Jun. 20, 2013).
- <http://metzerplas.com/en-US/50/845/>; Meterplas Cooperative Agricultural Organization Ltd., (2 pp., dated Jun. 20, 2013).
- Jaffe, E., Netafim Ltd., Patent Dept., Letter with attached Appendices A-B, dated Aug. 1, 2010, 35 pages.
- Jaffe, E., Netafim Ltd., Patent Dept., Letter with attached claim charts, dated Feb. 4, 2008, 6 pages.
- Jaffe, E., Netafim Ltd., Patent Dept., Letter with attached claim charts, dated Jul. 12, 2009, 4 pages.
- Jaffe, E., Netafim Ltd., Patent Dept., Letter with attachment, dated Feb. 4, 2008, 7 pages.
- Jaffe, E., Netafim, Ltd., Patent Dept., Letter with attached invoice, dated May 7, 2008, 2 pages.
- Jiang, W. et al., "Effects of Copper on Root Growth, Cell Division, and Nucleolus of Zea Mays," *Biologia Plantarum*, 44(1), 2001, pp. 105-109.
- Kuhns, L. et al., "Copper Toxicity in Woody Ornamentals," *Journal of Arboriculture*, Apr. 1976. pp. 68-78.
- Mastin, B.J., et al., "Toxicity and bioavailability of copper herbicides (Clearigate, Cutrine-Plus, and copper sulfate) to freshwater animals," *Arch Environ Contam Toxicol*, 39:445-451, (2000).
- Murray-Gulde, C.L., et al., "Algicidal effectiveness of Clearigate, Cutrine-Plus, and copper sulfate and margins of safety associated with their use," *Arch Environ Contam Toxicol* 42:19-27, (2002).
- Netafim International—Netafim USA—Internet site, 2003, 5 pages.
- Netafim Ltd., Appendix A, images of Netafim's Drip Net product, 1 page.
- Netafim Ltd., Appendix A, marked-up images of Netafim's Ram product, 1 page.
- Netafim Ltd., Appendix B, Invoice, Jan. 31, 1991, 1 page.
- Netafim Ltd., Appendix C, Netafim Ram Catalog, Jan. 2000, 4 pages.
- Netafim Ltd., Appendix D, Enlarged, marked-up excerpts from Netafim RAM Catalog, Jan. 2000, 1 page.
- Netafim USA, RAM Catalog Figures, Jan. 2000, 4 pages.
- Netafim USA, Triton X Heavywall Dripperline Catalog, May 2007, 8 pages.
- Non-Final Office Action dated Feb. 11, 2016; U.S. Appl. No. 13/430,308; 9 pages.
- Patent Cooperation Treaty, Application No. PCT/US2013/033866, International Search Report and Written Opinion dated Jun. 19, 2013, 38 pp.
- Patent Cooperation Treaty, International Search Report issued in International Application No. PCT/US2013/046603, dated Sep. 19, 2013, 2 pp.
- Patent Cooperation Treaty, International Searching Authority, Notification of Transmittal of the International Search Report and the Written Opinion of the International Searching Authority, or the Declaration, issued in International Application No. PCT/US/2014/054533, dated Dec. 25, 2014, 9 pp.
- Patent Cooperation Treaty, Notification of Transmittal of the International Search Report and the Written Opinion of the International Searching Authority issued in International Application No. PCT/US2013/033668, dated Jun. 17, 2013, 10 pp.
- Patent Cooperation Treaty, Notification of Transmittal of the International Search Report and the Written Opinion of the International Searching Authority issued in International Application No. PCT/US2014/050623, dated Nov. 20, 2014, 17 pp.
- Patent Cooperation Treaty, Notification of Transmittal of the International Search Report and the Written Opinion of the International Searching Authority, or the Declaration, Issued in International Application No. PCT/US2017042378, dated Oct. 26, 2017, 7 pp.
- Patent Cooperation Treaty, Written Opinion of the International Searching Authority issued in International Application No. PCT/US2013/046603, dated Sep. 19, 2013, 4 pp.
- PCT International Application No. PCT/US2013/033866 filed Mar. 26, 2013.
- Rain Bird Corporation, Agriculture Irrigation Equipment 1981 Catalog, 3 pages.
- Rain Bird Corporation, Drip Watering System 1994 Catalog, 1993, 16 pages.
- Rain Bird Corporation, Landscape Irrigation Products 1993-1994 Catalog, Feb. 1993, 5 pages.
- Rain Bird Corporation, Landscape Irrigation Products 1993-1994 Catalog, p. 120, Feb. 1993, 3 pages.
- Rain Bird Corporation, Landscape Irrigation Products 2001-2002 Catalog, Mar. 2001, 9 pages.
- Rain Bird Corporation, Landscape Irrigation Products 2001-2002 Catalog, pp. 181-184, Mar. 2001, 6 pages.
- Rain Bird Corporation, Landscape Irrigation Products 2005-2006 Catalog, Jun. 2004, 13 pages.
- Rain Bird Corporation, Landscape Irrigation Products 2005-2006 Catalog, pp. 230-232; 247-250, Jun. 2004, 10 pages.
- Rain Bird Corporation, Landscape Irrigation Products 2006-2007 Catalog, p. 222-224; 238-242, Jul. 2005, 11 pages.



(56)

**References Cited**

## OTHER PUBLICATIONS

- Rain Bird Corporation, Nursery Equipment Catalog 1986/1987, 1986, 3 pages.
- Rain Bird Corporation, PC Dripline Pressure Compensating Inline Emitter Tubing Catalog, Oct. 1998, 16 pages.
- Rain Bird Corporation, Turf Irrigation Equipment 1982 Catalog, 1982, 4 pages.
- Rain Bird Corporation, Turf Irrigation Equipment 1983 Catalog, 1983, 4 pages.
- Rain Bird Corporation, Turf Irrigation Equipment 1985 Catalog, 1985, 3 pages.
- Rain Bird Corporation, Turf Irrigation Equipment 1985 Catalog, p. 73, 1985, 3 pages.
- Rain Bird Corporation, Turf Irrigation Equipment 1987 Catalog, 1987, 6 pages.
- RAM Invoice Jan. 31, 1991.
- Schifris, Seba et al., "Inhibition of root penetration in subsurface driplines by impregnating the drippers with copper oxide particles," *Irrigation Science* (2015) 33:4, pp. 319-324.
- Smiley, E. T., "Root Growth Near Vertical Root Barriers," *International Society of Arboriculture*, 1995, pp. 150-152.
- Spera, G., et al., "Subsurface drip irrigation with micro-encapsulated trifluralin. Trifluralin residues in soils and cultivations," *Commun Agric Appl Biol Sci* 71:161-170, (2006).
- State Intellectual Property Office, First Office Action issued in Chinese Application No. 201380016629.9, dated Nov. 4, 2015, 16 pp.
- The Clean Estuary Partnership, "Copper Sources in Urban Runoff and Shoreline Activities," TDC Environmental, LLC, 2004, pp. 1-72.
- U.S. Appl. No. 11/359,181, filed Feb. 22, 2006, entitled "Drip Emitter," and issued on Jan. 19, 2010 as U.S. Pat. No. 7,648,085.
- U.S. Appl. No. 11/394,755, filed Mar. 31, 2006, entitled "Drip Emitter."
- U.S. Appl. No. 12/347,266, filed Dec. 31, 2008, entitled "Low Flow Irrigation Emitter."
- U.S. Appl. No. 12/367,295, filed Feb. 6, 2009, entitled "Low Flow Irrigation Emitter."
- U.S. Appl. No. 12/436,394, filed May 6, 2009, entitled "Drip Emitter and Methods of Assembly and Mounting."
- U.S. Appl. No. 12/495,178, filed Jun. 30, 2009, entitled "Drip Emitter."
- U.S. Appl. No. 12/495,193, filed Jun. 30, 2009, entitled "Drip Emitter," which is a continuation of U.S. Appl. No. 11/359,181.
- U.S. Appl. No. 13/430,249, filed Mar. 26, 2012.
- U.S. Appl. No. 13/964,903, filed Aug. 12, 2013.
- U.S. Appl. No. 14/139,217, filed Dec. 23, 2013.
- USPTO; U.S. Appl. No. 14/036,881; Notice of Allowance dated Aug. 24, 2017; (pp. 1-7).
- USPTO; U.S. Appl. No. 13/839,726; Notice of Allowance dated Sep. 14, 2017; (pp. 1-5).
- USPTO; U.S. Appl. No. 13/964,903; Notice of Allowance dated Aug. 4, 2017; (pp. 1-11).
- USPTO; U.S. Appl. No. 13/964,903; Notice of Allowance dated Sep. 18, 2017; (pp. 1-7).
- USPTO; U.S. Appl. No. 14/036,881; Corrected Notice of Allowability dated May 22, 2017.
- USPTO; U.S. Appl. No. 14/036,881; Notice of Allowability dated Nov. 29, 2017; (pp. 1-2).
- USPTO; U.S. Appl. No. 14/036,881; Notice of Allowability dated Dec. 26, 2017; (pp. 1-2).
- USPTO; U.S. Appl. No. 14/036,881; Notice of Allowance dated May 8, 2017.
- USPTO; U.S. Appl. No. 14/036,881; Notice of Allowance dated Dec. 23, 2016.
- USPTO; U.S. Appl. No. 14/036,881; Office Action dated Aug. 2, 2016.
- USPTO; U.S. Appl. No. 14/036,881; Office Action dated Dec. 9, 2015.
- USPTO; U.S. Appl. No. 14/385,564; Notice of Allowability dated Nov. 29, 2017; (pp. 1-2).
- USPTO; U.S. Appl. No. 14/385,564; Notice of Allowability dated Dec. 26, 2017; (pp. 1-2).
- USPTO; U.S. Appl. No. 14/385,564; Notice of Allowance dated Aug. 22, 2017; (pp. 1-8).
- USPTO; U.S. Appl. No. 14/475,435; Office Action dated Sep. 27, 2017; (pp. 1-9).
- USPTO; U.S. Appl. No. 14/518,774; Notice of Allowance dated Jan. 4, 2018; (pp. 1-4).
- USPTO; U.S. Appl. No. 14/518,774; Notice of Allowance dated Oct. 26, 2017; (pp. 1-7).
- USPTO; U.S. Appl. No. 14/851,545; Office Action dated Oct. 30, 2017; (pp. 1-27).
- USPTO; U.S. Appl. No. 14/910,573; Office Action dated Feb. 13, 2018; (pp. 1-10).
- USPTO; U.S. Appl. No. 15/331,407; Corrected Notice of Allowability dated Dec. 28, 2017; (pp. 1-2).
- USPTO; U.S. Appl. No. 15/331,407; Notice of Allowability dated Nov. 30, 2017; (pp. 1-2).
- USPTO; U.S. Appl. No. 15/331,407; Notice of Allowance dated Oct. 27, 2017; (pp. 1-9).
- USPTO; U.S. Appl. No. 15/331,407; Office Action dated Apr. 27, 2017.
- USPTO; U.S. Appl. No. 15/344,843; Corrected Notice of Allowability dated Dec. 28, 2017; (pp. 1-2).
- USPTO; U.S. Appl. No. 15/344,843; Notice of Allowability dated Nov. 30, 2017; (pp. 1-2).
- USPTO; U.S. Appl. No. 15/344,843; Notice of Allowance dated Oct. 16, 2017; (pp. 1-7).
- USPTO; U.S. Appl. No. 11/394,755, Office Action dated Aug. 14, 2008.
- USPTO; U.S. Appl. No. 11/394,755, Office Action dated Feb. 7, 2008.
- USPTO; U.S. Appl. No. 11/394,755, Office Action dated Jul. 17, 2007.
- USPTO; U.S. Appl. No. 11/394,755, Office Action dated Jul. 17, 2009.
- USPTO; U.S. Appl. No. 11/394,755, Office Action dated Mar. 31, 2009.
- USPTO; U.S. Appl. No. 11/394,755, Office Action dated May 12, 2011.
- USPTO; U.S. Appl. No. 11/394,755; Office Action dated Dec. 19, 2011.
- USPTO; U.S. Appl. No. 12/347,266, Office Action dated Mar. 7, 2011.
- USPTO; U.S. Appl. No. 12/347,266, Office Action dated Nov. 17, 2010.
- USPTO; U.S. Appl. No. 12/347,266, Office Action dated Sep. 7, 2010.
- USPTO; U.S. Appl. No. 12/367,295, Office Action dated Feb. 11, 2011.
- USPTO; U.S. Appl. No. 12/367,295, Office Action dated Jul. 15, 2011.
- USPTO; U.S. Appl. No. 12/367,295; Office Action dated Jun. 8, 2012.
- USPTO; U.S. Appl. No. 12/495,178, Office Action dated Feb. 3, 2010.
- USPTO; U.S. Appl. No. 12/495,178; Office Action dated Apr. 18, 2014; 12 pages.
- USPTO; U.S. Appl. No. 12/495,178; Office Action dated Jun. 21, 2012.
- USPTO; U.S. Appl. No. 12/495,178; Office Action dated Mar. 11, 2015; 6 pages.
- USPTO; U.S. Appl. No. 12/495,178; Office Action dated Nov. 18, 2014; 8 pages.
- USPTO; U.S. Appl. No. 12/495,178; Office Action dated Oct. 6, 2015; 8 pages.
- USPTO; U.S. Appl. No. 12/495,193, Office Action dated Jan. 6, 2012.
- USPTO; U.S. Appl. No. 12/495,193, Office Action dated May 11, 2011.

(56)

**References Cited**

## OTHER PUBLICATIONS

USPTO; U.S. Appl. No. 12/495,193; Advisory Action dated Sep. 5, 2013.

USPTO; U.S. Appl. No. 12/495,193; Notice of Allowance dated Feb. 10, 2017; 7 pages.

USPTO; U.S. Appl. No. 12/495,193; Notice of Allowance dated May 4, 2017.

USPTO; U.S. Appl. No. 12/495,193; Notice of Allowance dated Oct. 14, 2016; 7 pages.

USPTO; U.S. Appl. No. 12/495,193; Office Action dated Apr. 18, 2014; 23 pages.

USPTO; U.S. Appl. No. 12/495,193; Office Action dated Aug. 29, 2016.

USPTO; U.S. Appl. No. 12/495,193; Office Action dated Jan. 15, 2015; 11 pages.

USPTO; U.S. Appl. No. 12/495,193; Office Action dated Jun. 18, 2013.

USPTO; U.S. Appl. No. 12/495,193; Office Action dated Oct. 1, 2015; 9 pages.

USPTO; U.S. Appl. No. 13/430,249; Notice of Allowance dated Apr. 14, 2016; 7 pages.

USPTO; U.S. Appl. No. 13/430,249; Notice of Allowance dated Sep. 19, 2016; 6 pages.

USPTO; U.S. Appl. No. 13/430,249; Office Action dated Mar. 24, 2015; 10 pages.

USPTO; U.S. Appl. No. 13/430,249; Office Action dated Oct. 26, 2015; 10 pages.

USPTO; U.S. Appl. No. 13/800,354; Office Action dated Sep. 25, 2014; 13 pages.

USPTO; U.S. Appl. No. 13/839,726; Notice of Allowance dated Aug. 15, 2016; 5 pages.

USPTO; U.S. Appl. No. 13/839,726; Notice of Allowance dated Dec. 1, 2016; 5 pages.

USPTO; U.S. Appl. No. 13/839,726; Notice of Allowance dated Dec. 31, 2015; 5 pages.

USPTO; U.S. Appl. No. 13/839,726; Office Action dated Apr. 26, 2016; 4 pages.

USPTO; U.S. Appl. No. 13/839,726; Office Action dated Mar. 20, 2017; 4 pages.

USPTO; U.S. Appl. No. 13/839,726; Office Action dated May 28, 2015; 5 pages.

USPTO; U.S. Appl. No. 13/839,726; Office Action dated May 30, 2017; (4 pages).

USPTO; U.S. Appl. No. 13/964,903; Office Action dated Jun. 3, 2015; 21 pages.

USPTO; U.S. Appl. No. 13/964,903; Office Action dated Mar. 7, 2016; 21 pages.

USPTO; U.S. Appl. No. 14/047,489; Office Action dated Jun. 29, 2015; 7 pages.

USPTO; U.S. Appl. No. 14/047,489; Office Action dated Oct. 7, 2015; 9 pages.

USPTO; U.S. Appl. No. 14/139,217; Office Action dated Apr. 8, 2015; 9 pages.

USPTO; U.S. Appl. No. 14/139,217; Office Action dated Sep. 18, 2015; 11 pages.

USPTO; U.S. Appl. No. 14/385,564; Office Action dated Aug. 10, 2016; 9 pages.

USPTO; U.S. Appl. No. 14/385,564; Office Action dated Mar. 10, 2017; 8 pages.

USPTO; U.S. Appl. No. 14/475,435; Office Action dated Jan. 26, 2017.

USPTO; U.S. Appl. No. 14/475,435; Office Action dated Jul. 20, 2016; 9 pages.

USPTO; U.S. Appl. No. 14/518,774; Office Action dated May 10, 2017.

USPTO; U.S. Appl. No. 14/851,545; Office Action dated Apr. 24, 2017.

USPTO; U.S. Appl. No. 14/910,573; Office Action dated Jun. 27, 2017; (10 pages).

USPTO; U.S. Appl. No. 15/344,843; Office Action dated Apr. 28, 2017.

USPTO; U.S. Appl. No. 13/964,903; Office Action dated Oct. 31, 2016; 22 pages.

Wagar, J. Alan, et al., "Effectiveness of Three Barrier Materials for Stopping Regenerating Roots of Established Trees," *Journal of Arboriculture*, 19(6), Nov. 1993, pp. 332-338.

Westgate, Philip J., "Preliminary Report on Copper Toxicity and Iron Chlorosis in Old Vegetable Fields," *Florida State Horticultural Society*, 1952, pp. 143-146.

Eco iMat LLC dba ecorain® USA, iMat Solution, <[www.ecorainusa.com](http://www.ecorainusa.com)>, illustrating a product available since Nov. 25, 2015, 6 pages.

Encyclopaedia Britannica, Inc., "Peristalsis," Nov. 30, 2017, [online]. Retrieved from the Internet: <URL: <https://www.britannica.com/print/article/452053>>, 2 pages.

USPTO; U.S. Appl. No. 14/910,573; Notice of Allowance dated Sep. 3, 2019; (pp. 1-11).

USPTO; U.S. Appl. No. 14/910,573; Notice of Allowance dated Dec. 23, 2019; (pp. 1-5).

USPTO; U.S. Appl. No. 15/665,848; Office Action dated Jan. 8, 2020; (pp. 1-11).

USPTO; U.S. Appl. No. 15/665,848; Office Action dated Aug. 30, 2019; (pp. 1-12).

USPTO; U.S. Appl. No. 15/858,685; Office Action dated Jan. 14, 2020; (pp. 1-10).

USPTO; U.S. Appl. No. 15/881,285; Office Action dated Dec. 30, 2019; (pp. 1-12).

USPTO; U.S. Appl. No. 15/952,510; Office Action dated Aug. 6, 2019; (pp. 1-14).

USPTO; U.S. Appl. No. 16/532,006; Office Action dated Jan. 6, 2020; (pp. 1-10).

ECOO Rain AG, iMat® Irrigation Mat, <[http://www.ecorain.de/files/imat\\_irrigation\\_mat.pdf](http://www.ecorain.de/files/imat_irrigation_mat.pdf)>, illustrating a product available since Sep. 18, 2016, 8 pages.

ecorain USA, iMat Faq document, illustrating a product available since 2017, 6 pages.

European Patent Office, Extended European Search Report for European Application No. 17831631.1, dated Feb. 3, 2020, 9 pages.

USPTO; U.S. Appl. No. 15/595,427; Notice of Allowance dated Jan. 23, 2020; (pp. 1-7).

\* cited by examiner

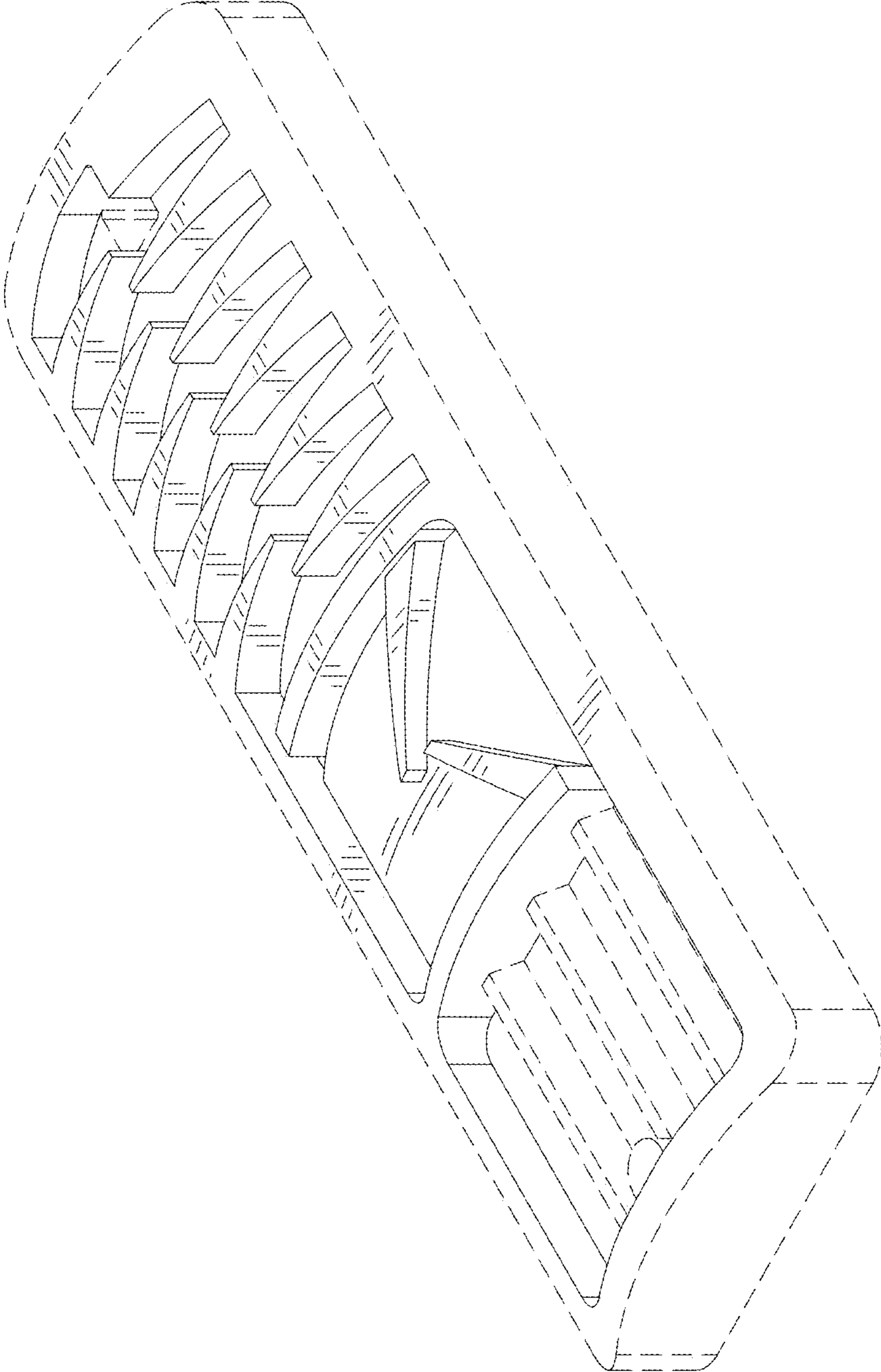


FIG. 1

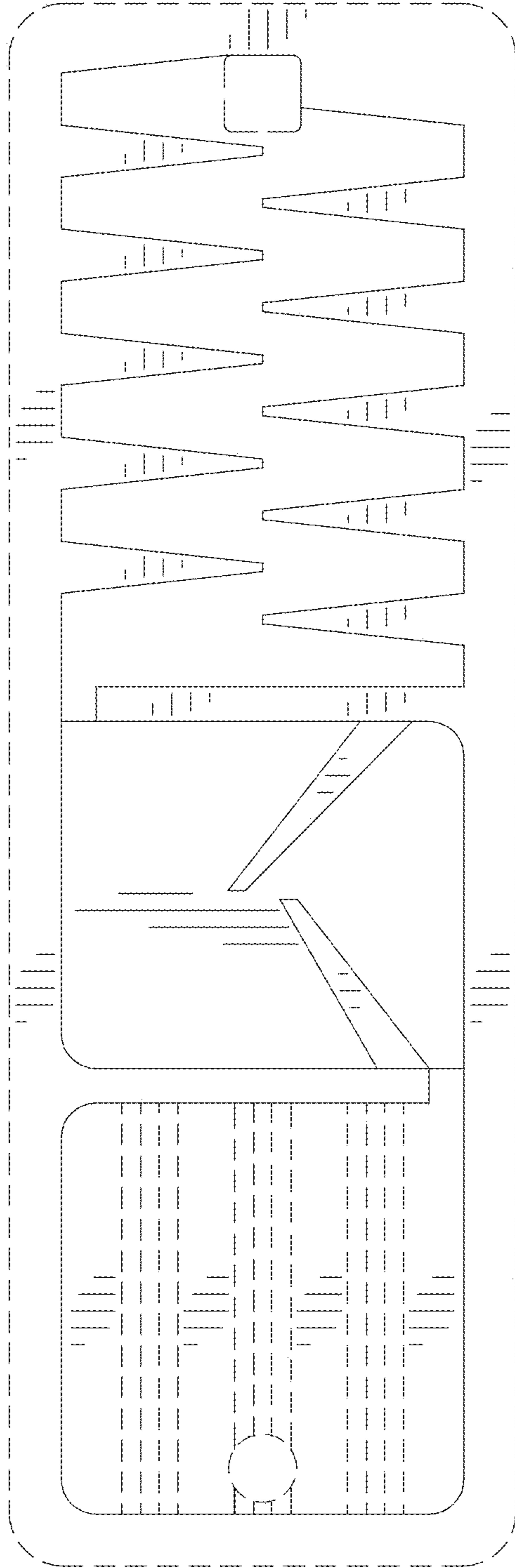


FIG. 2

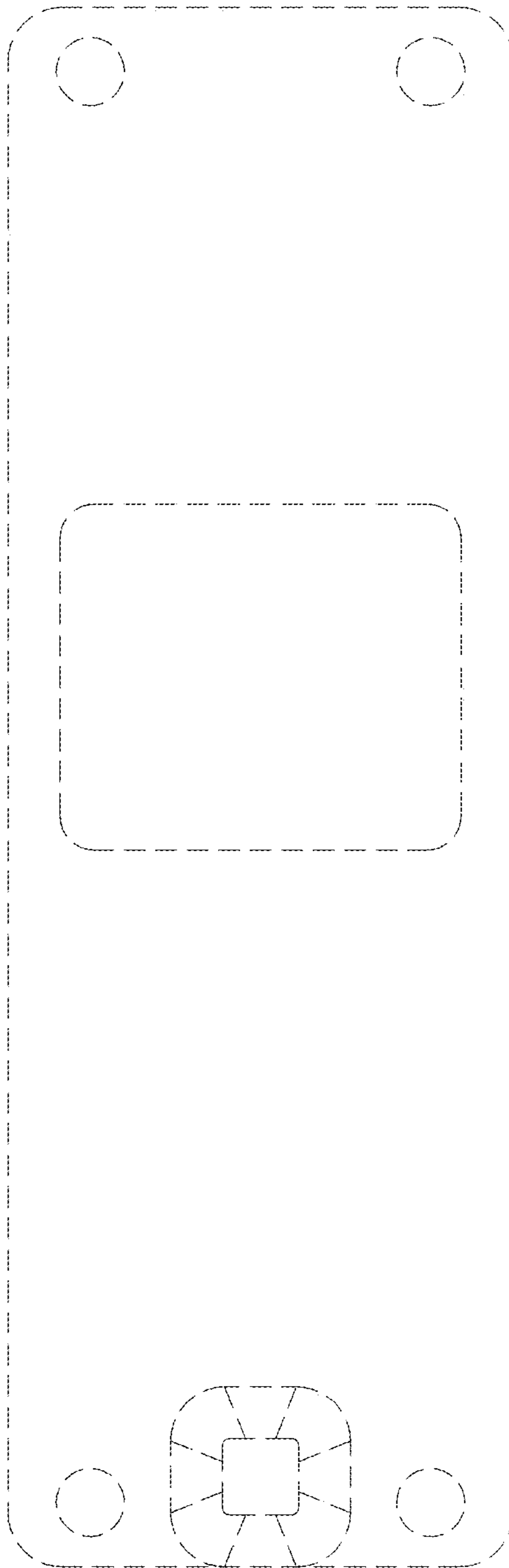


FIG. 3

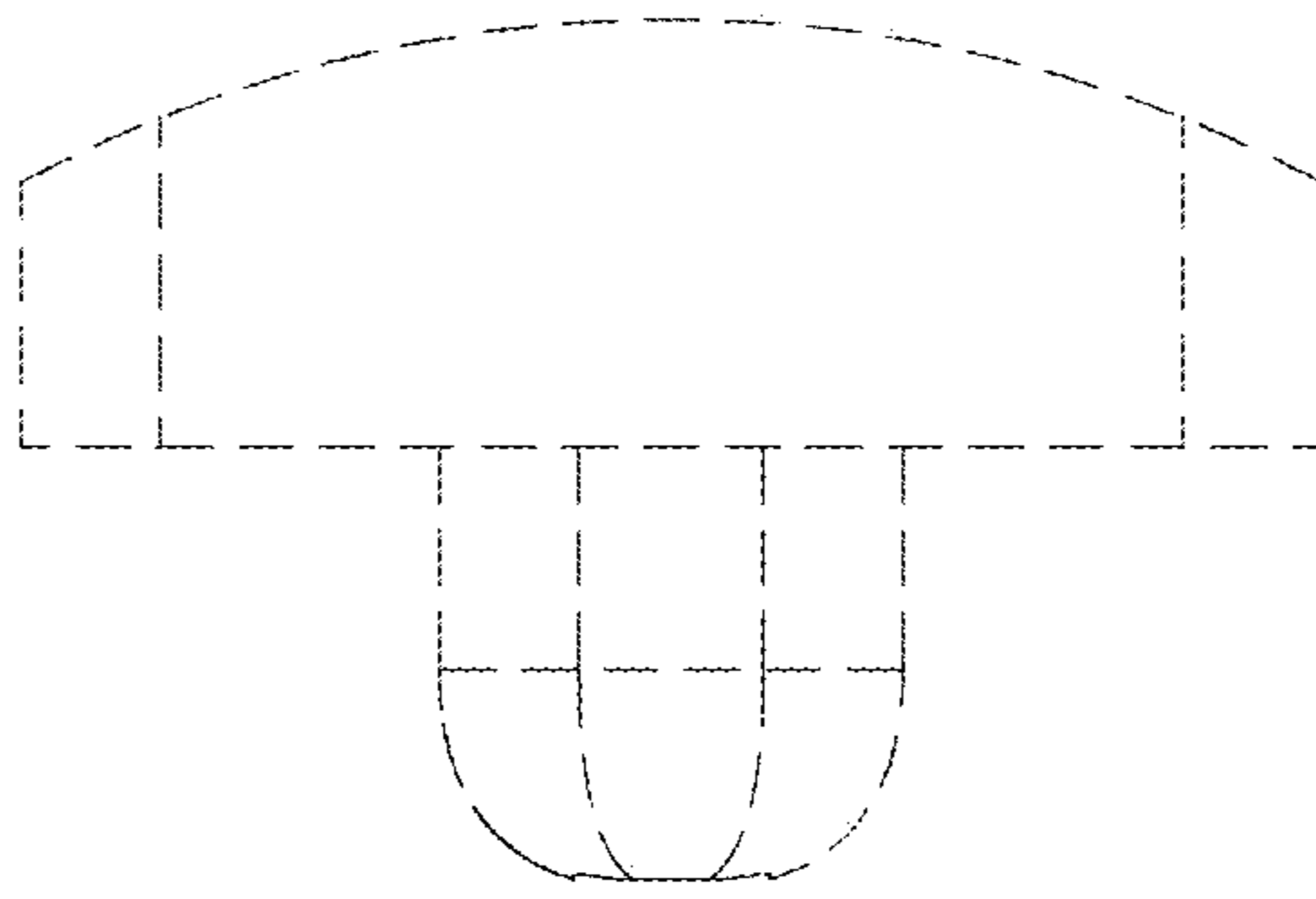


FIG. 4

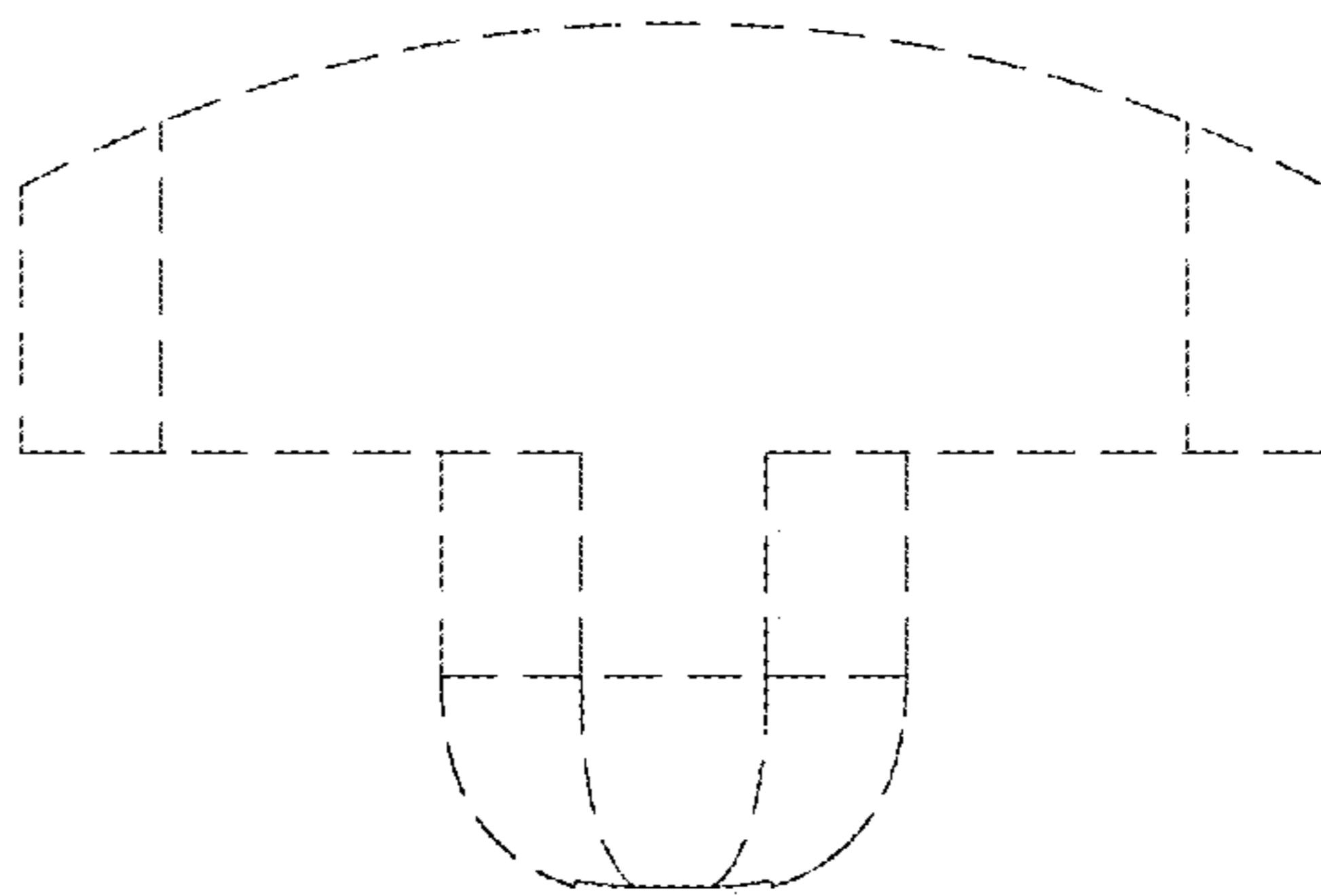


FIG. 5

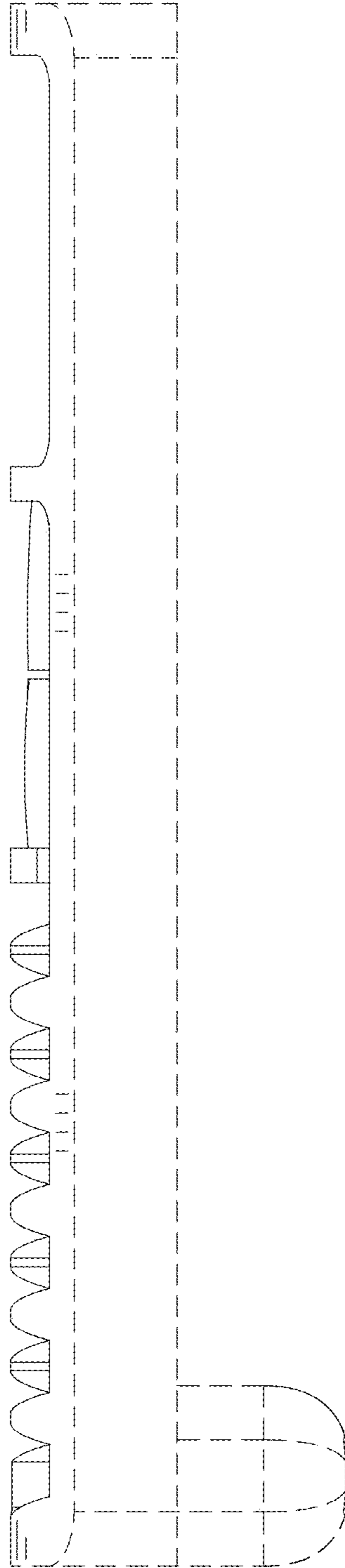


FIG. 6

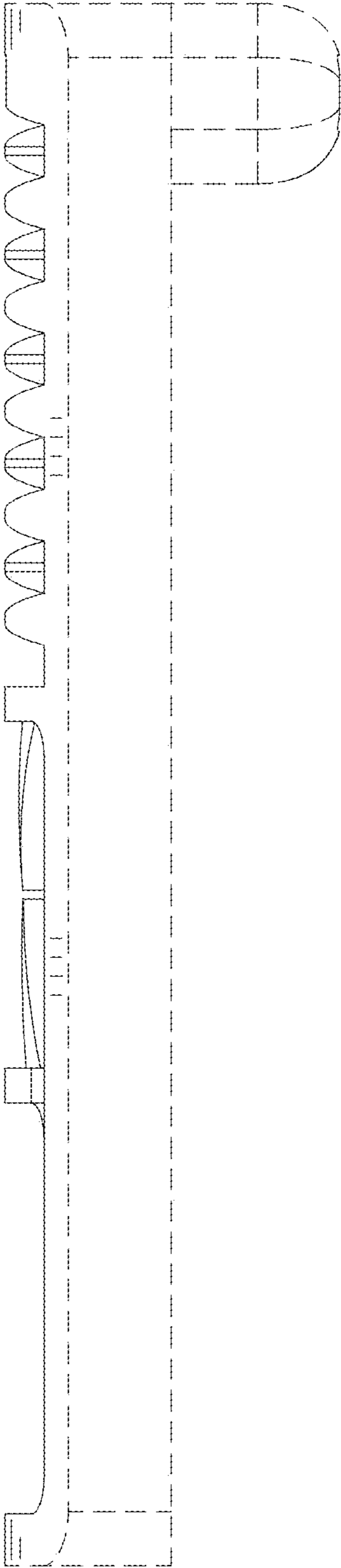


FIG. 7



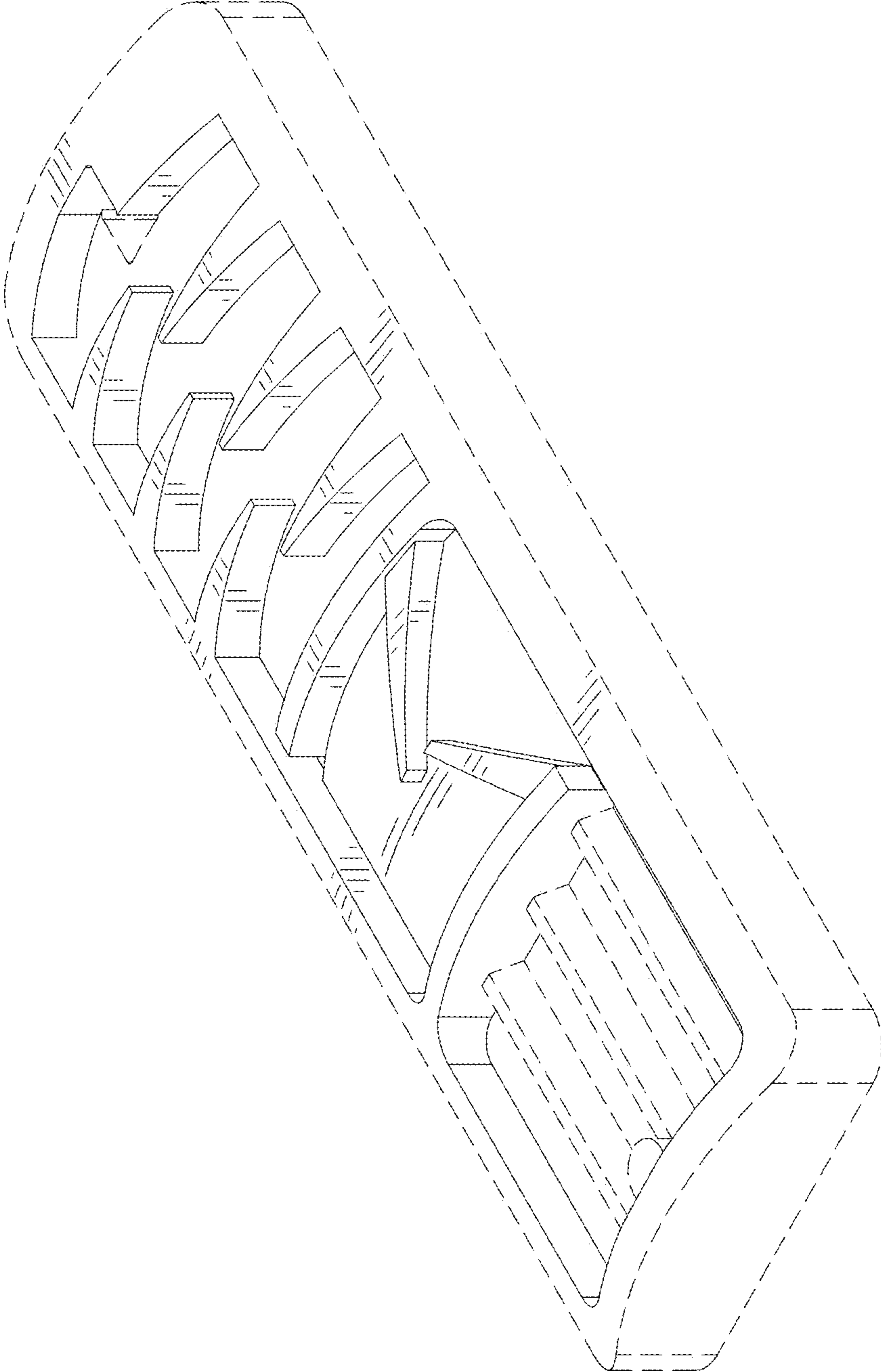


FIG. 8

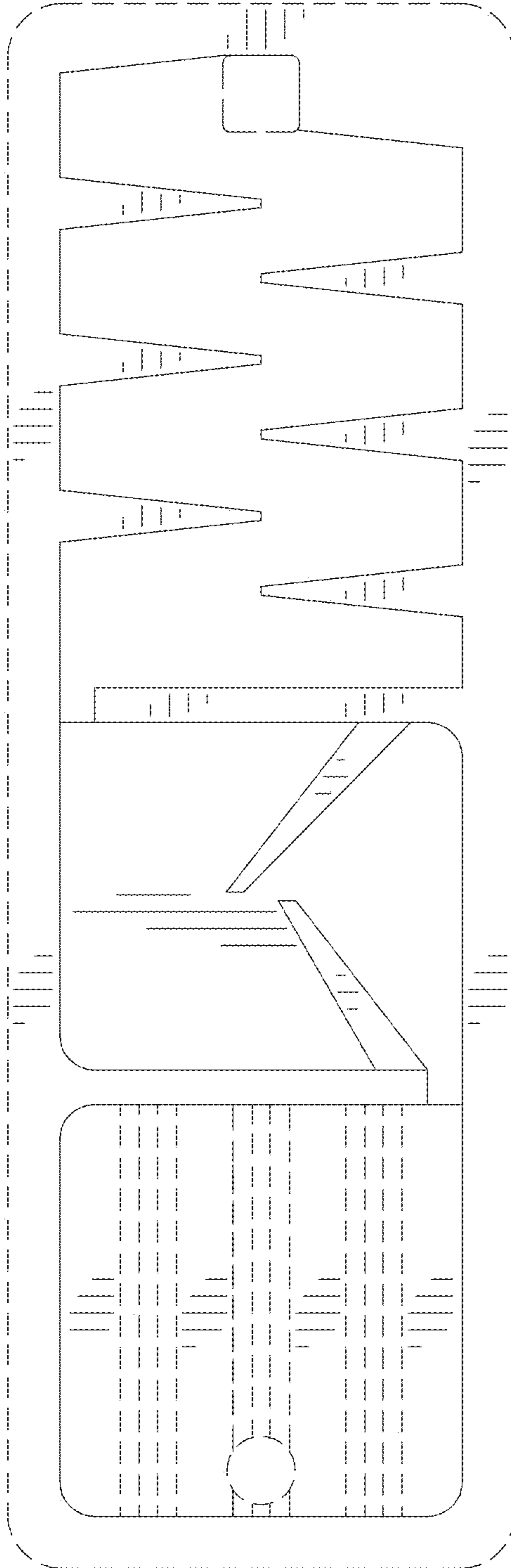


FIG. 9

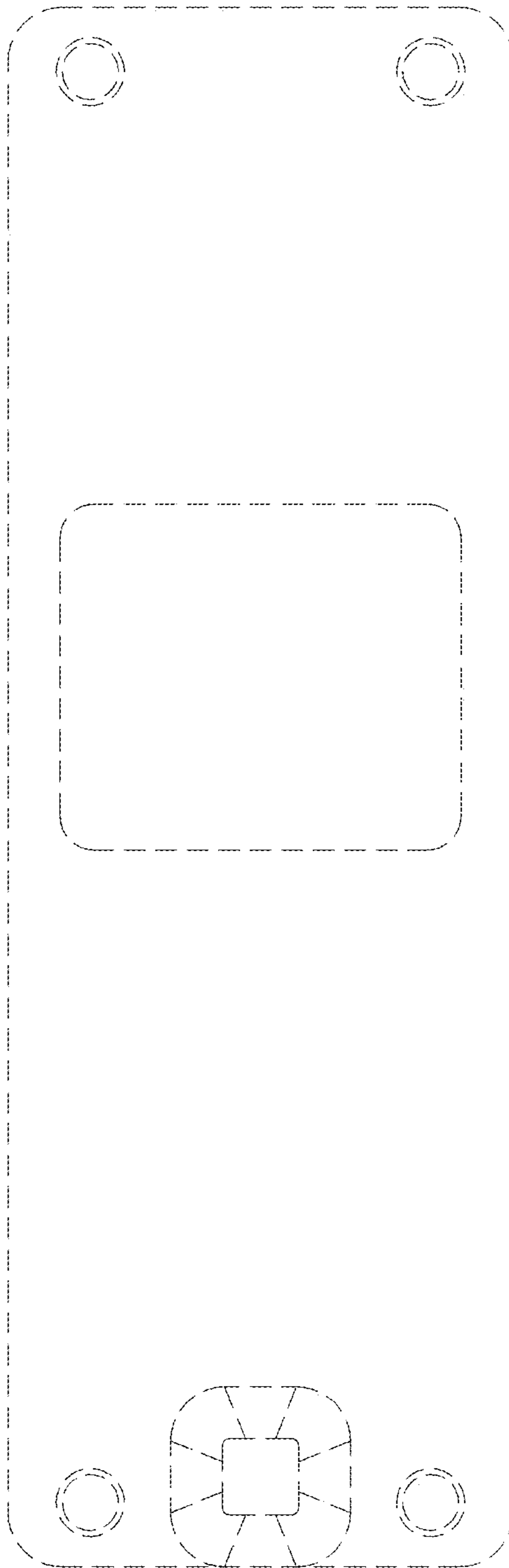


FIG. 10

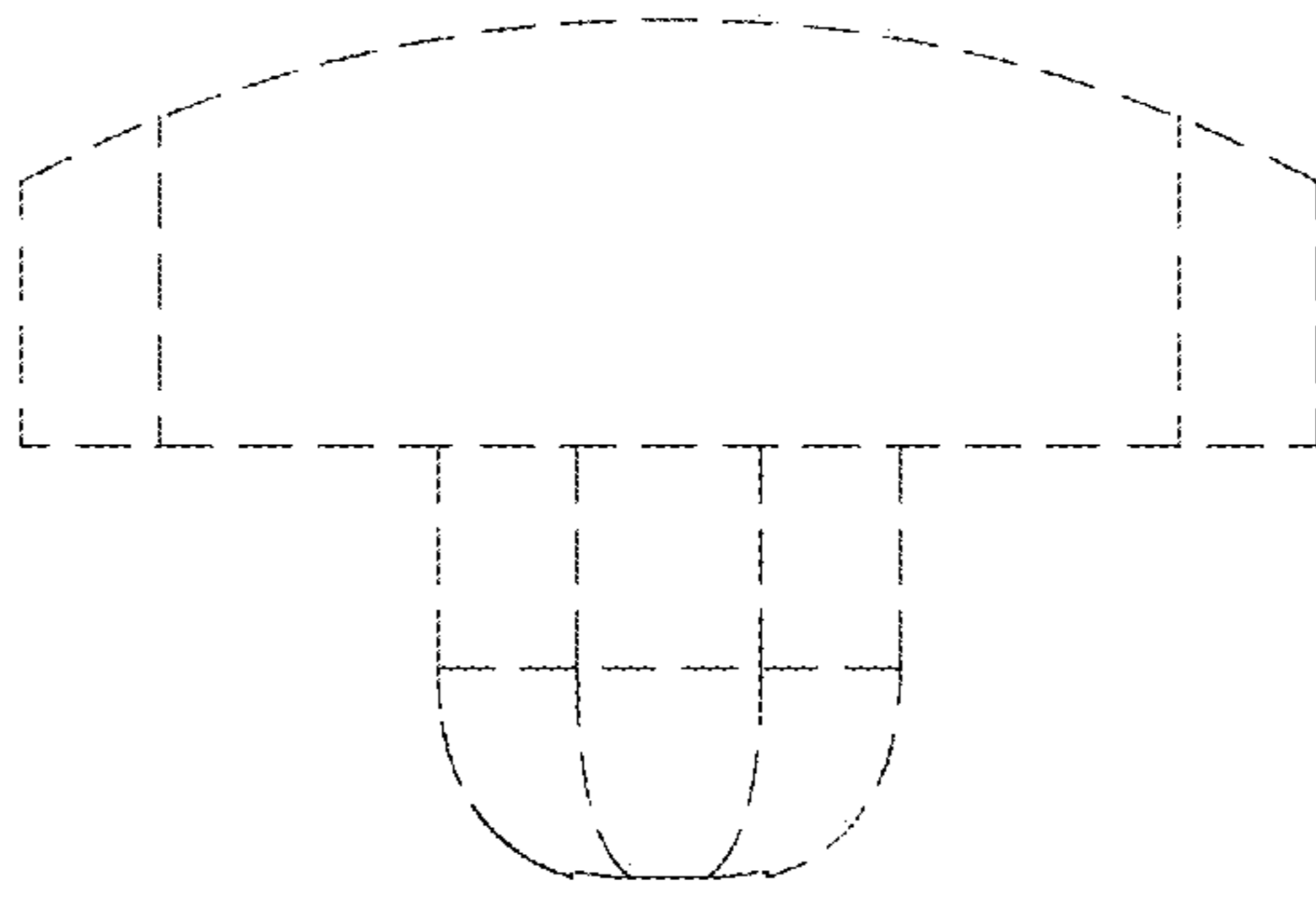


FIG. 11

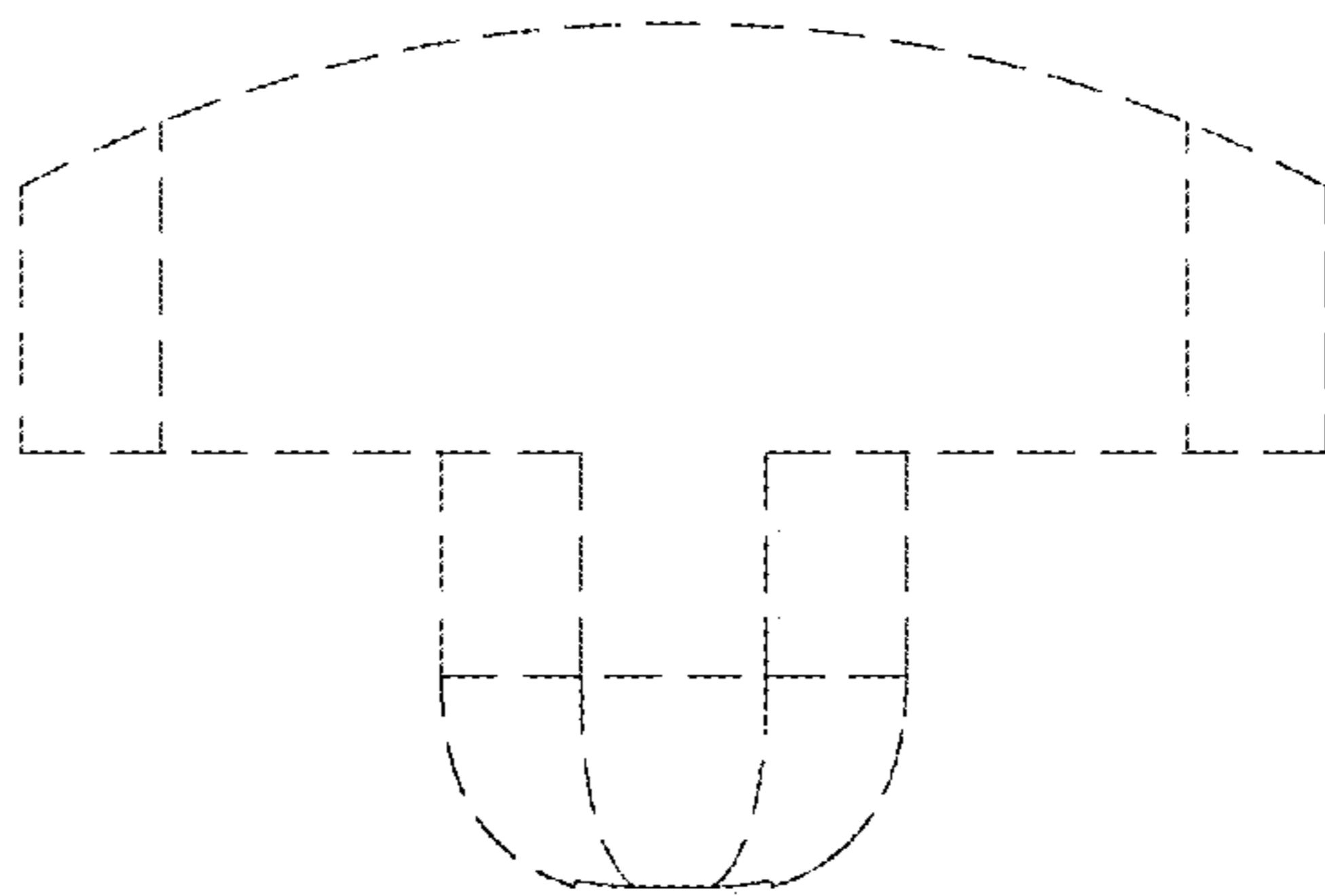


FIG. 12

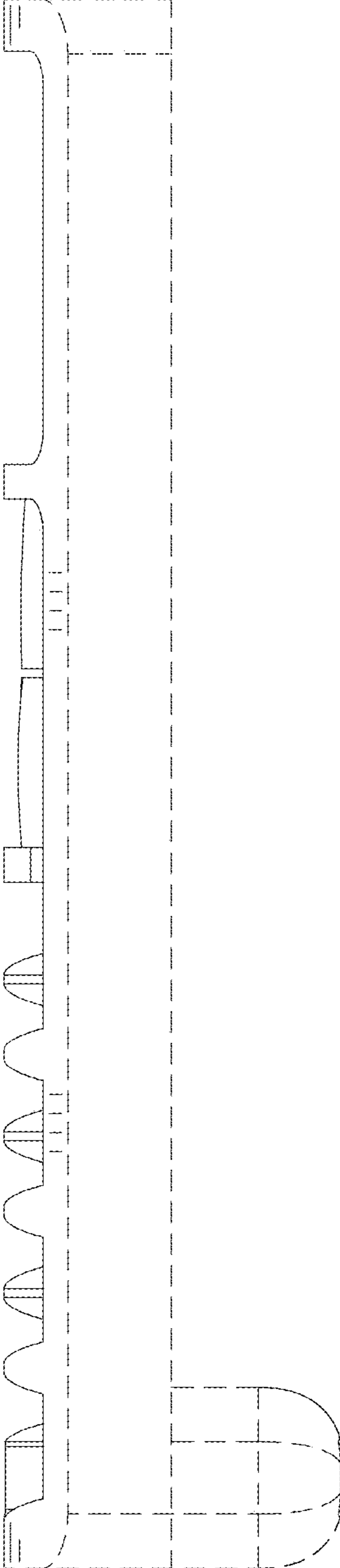


FIG. 13

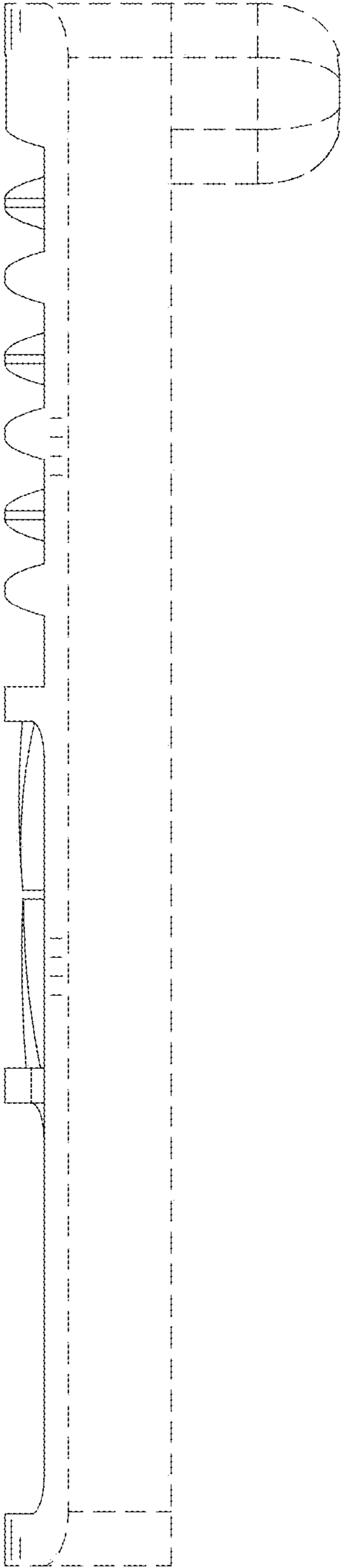


FIG. 14