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(12) **United States Design Patent** (10) **Patent No.:** **US D977,457 S**
Bullimore et al. (45) **Date of Patent:** **** Feb. 7, 2023**

(54) **WAVEGUIDE**

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- (**) Term: **15 Years**
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Related U.S. Application Data

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(30) **Foreign Application Priority Data**

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- (51) **LOC (14) Cl.** **14-01**

- (52) **U.S. Cl.**
USPC **D14/221**; D14/222

- (58) **Field of Classification Search**
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CPC . H04R 25/00; H04R 1/02; H04R 9/04; H04R 9/06; H04R 11/02; H04R 7/16; H04R 7/00; H05K 5/00

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 1,247,906 A * 11/1917 Tully B65D 85/808 D7/667
- 1,388,721 A 8/1921 Keeping
- 1,950,817 A * 3/1934 Rossman E03C 1/264 4/291
- 1,991,526 A 2/1935 Tichenor et al.
- 2,030,501 A 2/1936 Cunningham
- 2,225,693 A * 12/1940 Frances E03C 1/264 4/291
- 2,475,516 A 7/1949 Quam
- 2,496,589 A 2/1950 Firth
- 2,521,744 A 9/1950 Crossthwaite
- 2,537,723 A 1/1951 Leslie
- 2,539,672 A 1/1951 Olson et al.
- 2,760,672 A * 8/1956 Cronheim A47J 37/101 220/369
- 2,857,478 A 10/1958 Harris
- D191,184 S * 8/1961 Scholz D23/261

(Continued)

FOREIGN PATENT DOCUMENTS

- CN 305920534 * 7/2020
- CN 306092607 * 10/2020

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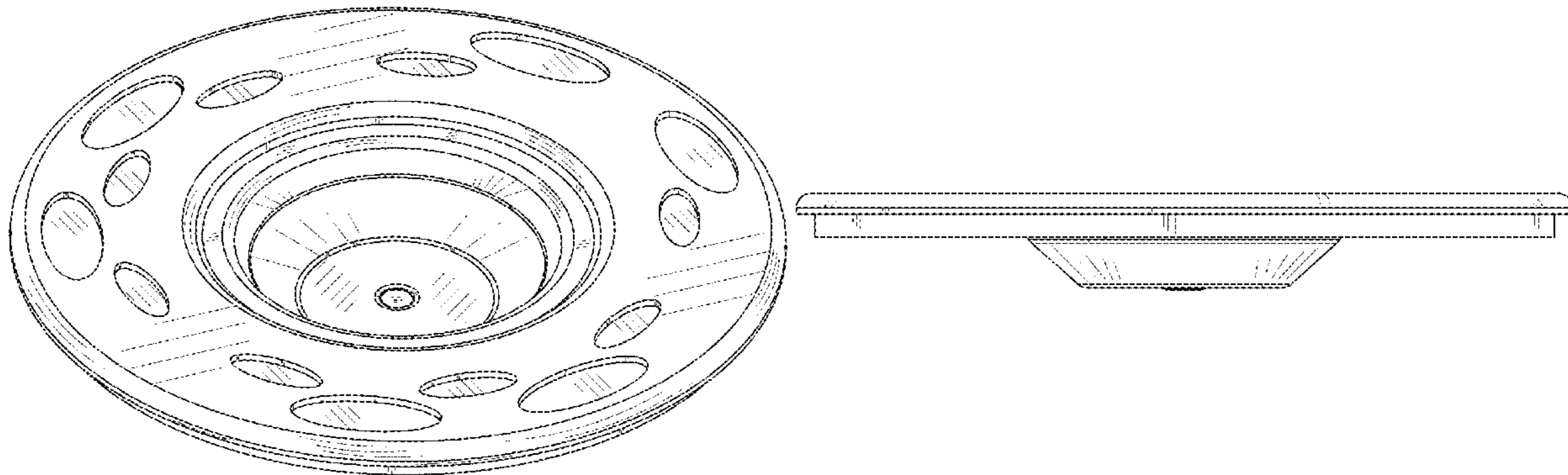
(57) **CLAIM**

The ornamental design for a waveguide, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a waveguide showing our new design;
FIG. 2 is a top plan view thereof;
FIG. 3 is a bottom plan view thereof; and,
FIG. 4 is a side plan view thereof.

1 Claim, 4 Drawing Sheets



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References Cited

U.S. PATENT DOCUMENTS

3,152,661 A * 10/1964 Wolff H04R 7/122
181/168
3,213,209 A 10/1965 Doelitzsch
3,494,444 A * 2/1970 Coen H04R 31/00
181/171
3,570,022 A * 3/1971 Nealy E03C 1/23
4/287
3,618,185 A * 11/1971 Coen B21D 31/04
29/6.1
3,862,376 A 1/1975 White
D239,538 S 4/1976 Wagner
D241,875 S * 10/1976 Insalaco D11/164
3,997,023 A 12/1976 White
D244,781 S 6/1977 Saidel
D250,586 S 12/1978 Nussdorfer et al.
4,146,110 A 3/1979 Maloney et al.
4,206,832 A 6/1980 Yocum
4,289,929 A 9/1981 Ward
4,324,312 A 4/1982 Durbin
4,365,114 A 12/1982 Soma
4,418,248 A 11/1983 Mathis
4,492,826 A 1/1985 Chiu
4,554,414 A 11/1985 House
D286,319 S * 10/1986 Mathis D23/261
D288,807 S * 3/1987 Hlavaty D14/215
D290,166 S * 6/1987 Jacuzzi D23/261
4,811,406 A 3/1989 Kawachi
4,910,811 A * 3/1990 Izzi, Sr. E03C 1/262
210/163
D311,849 S * 11/1990 Strand D7/354
5,097,753 A * 3/1992 Naft A47J 27/022
D7/354
D333,468 S * 2/1993 Hansen D14/222
D357,480 S 4/1995 Lumsden et al.
5,455,396 A 10/1995 Willard et al.
5,524,061 A 6/1996 Mooney et al.
5,548,657 A 8/1996 Fincham
5,550,332 A 8/1996 Sakamoto
5,625,701 A * 4/1997 Scanlan H04R 7/16
381/403
5,627,904 A * 5/1997 Yang H04R 1/025
381/87
5,662,138 A * 9/1997 Wang E03F 5/042
137/533.15
5,902,481 A * 5/1999 Schwietert A47J 43/24
210/474
D413,656 S * 9/1999 Mauk D23/261
6,343,128 B1 1/2002 Coffin
D466,198 S * 11/2002 Mullings D23/261
6,516,077 B1 2/2003 Yamaguchi et al.
6,697,496 B2 2/2004 Frasl

6,789,683 B1 * 9/2004 Fisher A47J 36/08
99/413
D513,462 S * 1/2006 VanGilder D7/391
7,054,459 B2 5/2006 Kuze et al.
D523,848 S 6/2006 Shing
D537,519 S * 2/2007 Sigillo D23/393
D550,819 S * 9/2007 Seehoff D23/261
7,325,650 B2 2/2008 Horigome et al.
D564,636 S * 3/2008 Hanna D23/261
D577,005 S 9/2008 Amai
7,428,946 B2 9/2008 Honda et al.
D598,717 S * 8/2009 Jalet D7/667
D629,238 S * 12/2010 Dimitracas D6/583
D633,347 S * 3/2011 Boris B07B 1/06
D7/667
8,130,994 B2 * 3/2012 Button H04R 1/2853
381/337
D674,375 S 1/2013 Robineau
D691,245 S * 10/2013 Ho D23/261
8,842,873 B2 9/2014 Bullimore
9,025,809 B1 5/2015 Kallen et al.
D736,353 S * 8/2015 Lucas D23/261
D738,861 S 9/2015 Yang
9,467,783 B2 10/2016 Bullimore
D771,600 S 11/2016 Hinokio et al.
9,532,145 B2 12/2016 Niedermann
D777,887 S * 1/2017 Johansen D23/261
D795,143 S * 8/2017 Niemann D12/180
D808,935 S 1/2018 Bullimore
D816,132 S * 4/2018 Nymark D15/126
D831,618 S 10/2018 Lee et al.
D843,973 S 3/2019 Klosowski et al.
D855,160 S * 7/2019 Najimi D23/261
D856,981 S 8/2019 Bullimore
D865,719 S * 11/2019 Tanabe D14/221
D874,617 S * 2/2020 Chen D23/261
D875,084 S 2/2020 Lopez Castillo et al.
D877,122 S 3/2020 Klosowski et al.
D881,846 S * 4/2020 Chen D14/222
D900,285 S * 10/2020 Liu D23/261
D900,760 S * 11/2020 Kouzuma D15/126
11,102,575 B1 8/2021 Bullimore et al.
D941,441 S * 1/2022 Ghiorghie D23/261
2001/0043713 A1 11/2001 Tokusho et al.
2008/0101648 A1 * 5/2008 Hatanaka H04R 9/025
381/412
2008/0298629 A1 * 12/2008 Huang H04R 9/06
381/398
2010/0220888 A1 * 9/2010 Huang H02K 33/16
381/400
2011/0223825 A1 9/2011 Chen
2013/0064413 A1 3/2013 Cazes Bouchet
2014/0119579 A1 5/2014 Servado
2015/0038046 A1 2/2015 Lindberg
2016/0198256 A1 7/2016 Bogdanov et al.

* cited by examiner

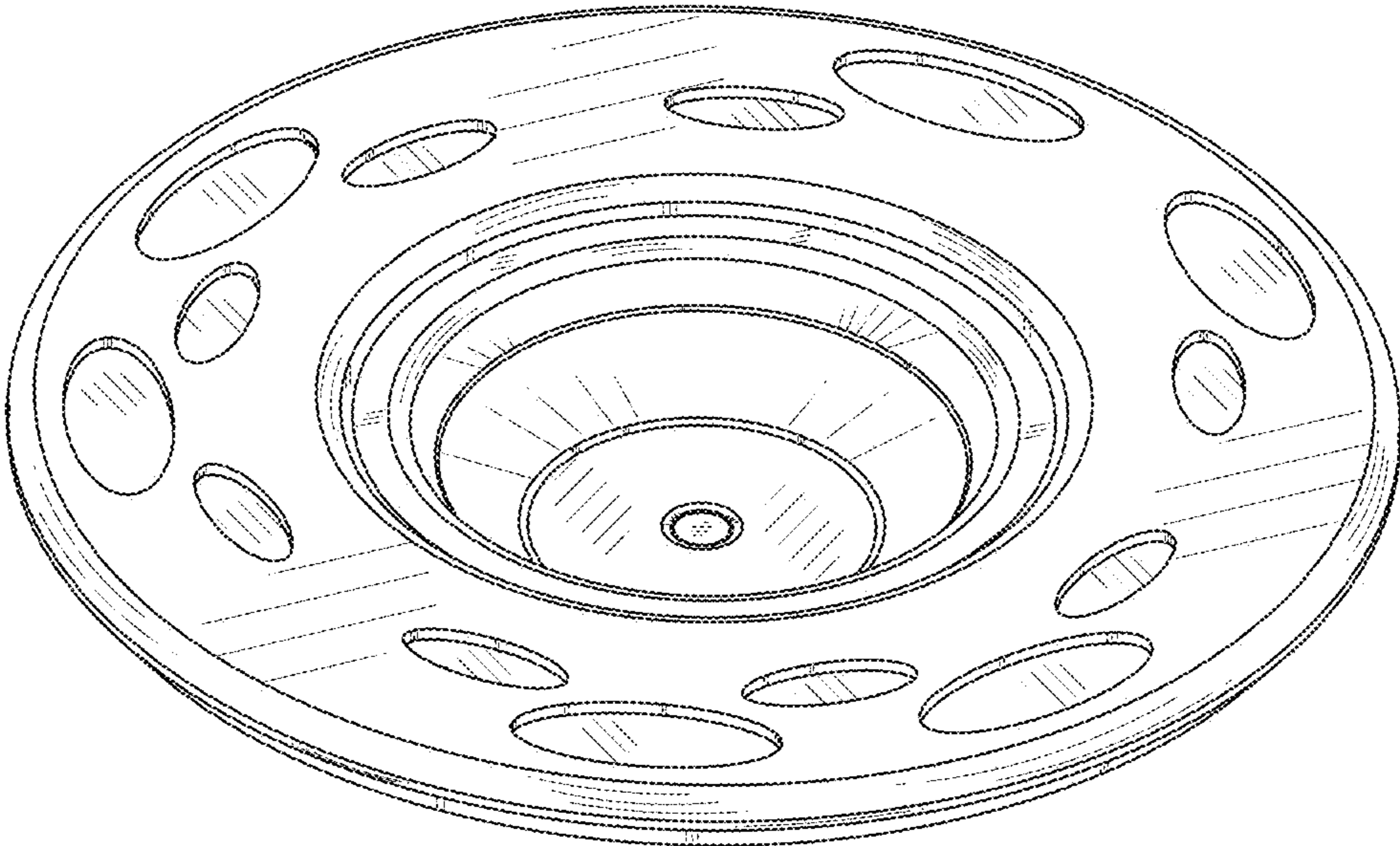


Fig.1

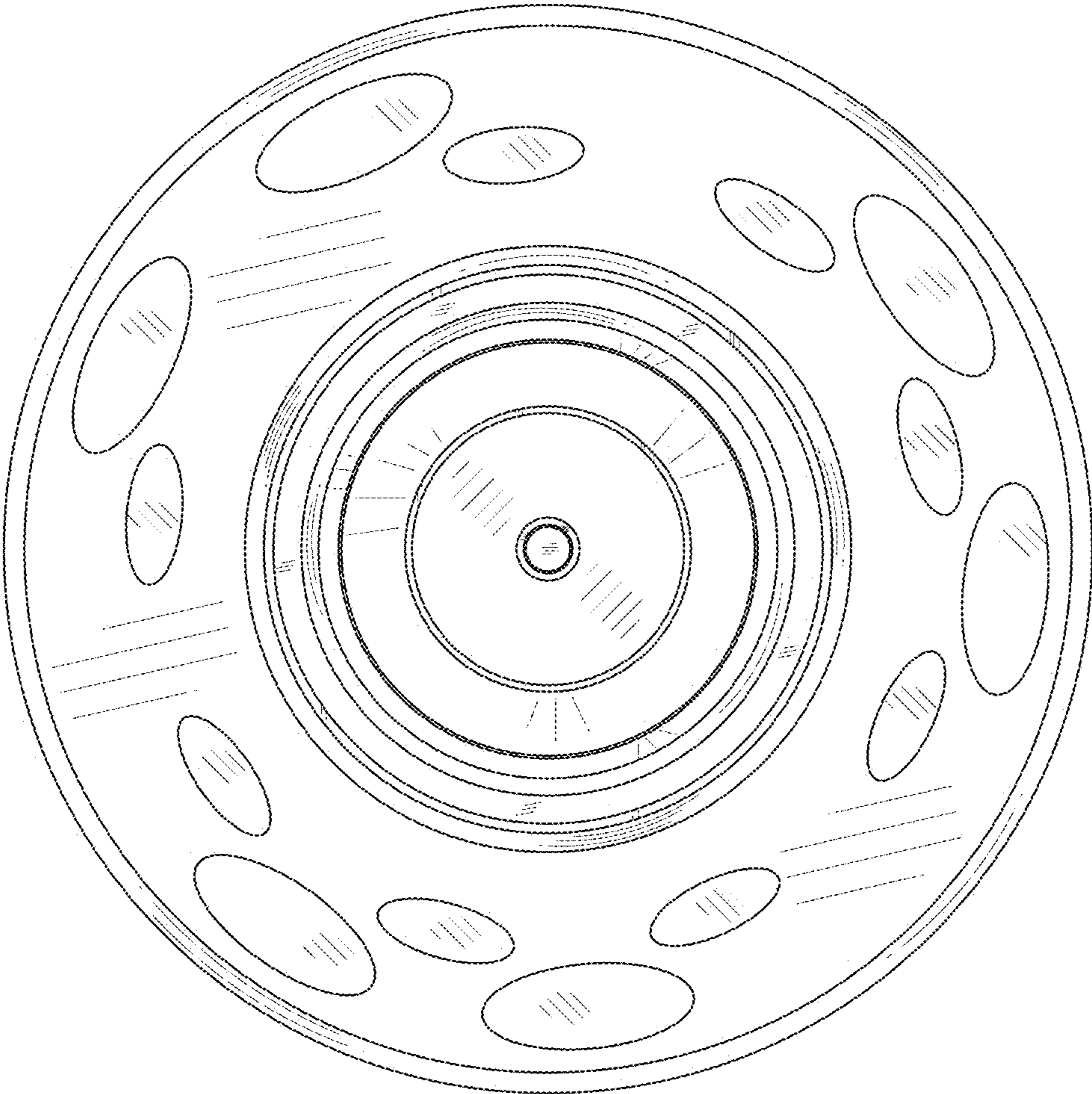


Fig.2



Fig.3

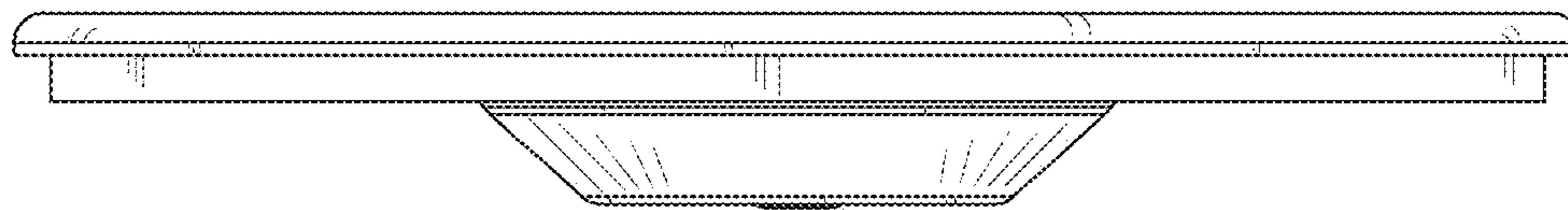


Fig.4