



US00D717932S

(12) **United States Design Patent**
Mross et al.

(10) **Patent No.:** **US D717,932 S**
(45) **Date of Patent:** **** Nov. 18, 2014**

(54) **HEAT EXCHANGER**

FOREIGN PATENT DOCUMENTS

(75) Inventors: **Greg Mross**, Sturtevant, WI (US); **Brad Engel**, Waterford, WI (US); **Mark Johnson**, Racine, WI (US); **Michael Reinke**, Franklin, WI (US)

DE 102007016050 10/2007
EP 1298401 4/2003
WO 2005088225 9/2005

(73) Assignee: **Modine Manufacturing Company**, Racine, WI (US)

Notification of First Chinese Office Action for Chinese Application No. 201110083129.X dated Apr. 8, 2014 (19 pages).

(**) Term: **14 Years**

(Continued)

(21) Appl. No.: **29/390,394**

Primary Examiner — T. Chase Nelson

(22) Filed: **Apr. 25, 2011**

Assistant Examiner — Ania Aman

(51) **LOC (10) Cl.** **23-03**

(74) *Attorney, Agent, or Firm* — Michael Best & Friedrich LLP

(52) **U.S. Cl.**

(57) **CLAIM**

USPC **D23/323**

The ornamental design for a heat exchanger, as shown and described.

(58) **Field of Classification Search**

DESCRIPTION

USPC D23/314, 323, 330, 386, 499; 165/499, 165/450, 152, 182, DIG. 501, 176, 165
See application file for complete search history.

FIG. 1 is a perspective view of a heat exchanger embodying the invention.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,000,257	A *	3/1991	Shinmura	165/140
5,000,681	A *	3/1991	Zafred et al.	432/224
5,035,052	A *	7/1991	Suzuki et al.	29/890.046
5,036,909	A *	8/1991	Whitehead et al.	165/133
5,086,835	A *	2/1992	Shinmura	165/144
5,314,013	A *	5/1994	Tanabe	165/176
5,327,959	A	7/1994	Saperstein et al.	
5,370,176	A *	12/1994	Nishishita et al.	165/81
5,426,847	A *	6/1995	Honma et al.	29/726
5,467,818	A *	11/1995	Buckley, Jr.	165/178
5,529,116	A *	6/1996	Sasaki et al.	165/144
5,605,191	A *	2/1997	Eto et al.	165/176
RE35,710	E *	1/1998	Shinmura	165/140
5,743,328	A *	4/1998	Sasaki et al.	165/144

FIG. 2 is a left side view of the heat exchanger shown in FIG. 1.

FIG. 3 is a right side view of the heat exchanger shown in FIG. 1.

FIG. 4 is a top view of the heat exchanger shown in FIG. 1.

FIG. 5 is a bottom view of the heat exchanger shown in FIG. 1.

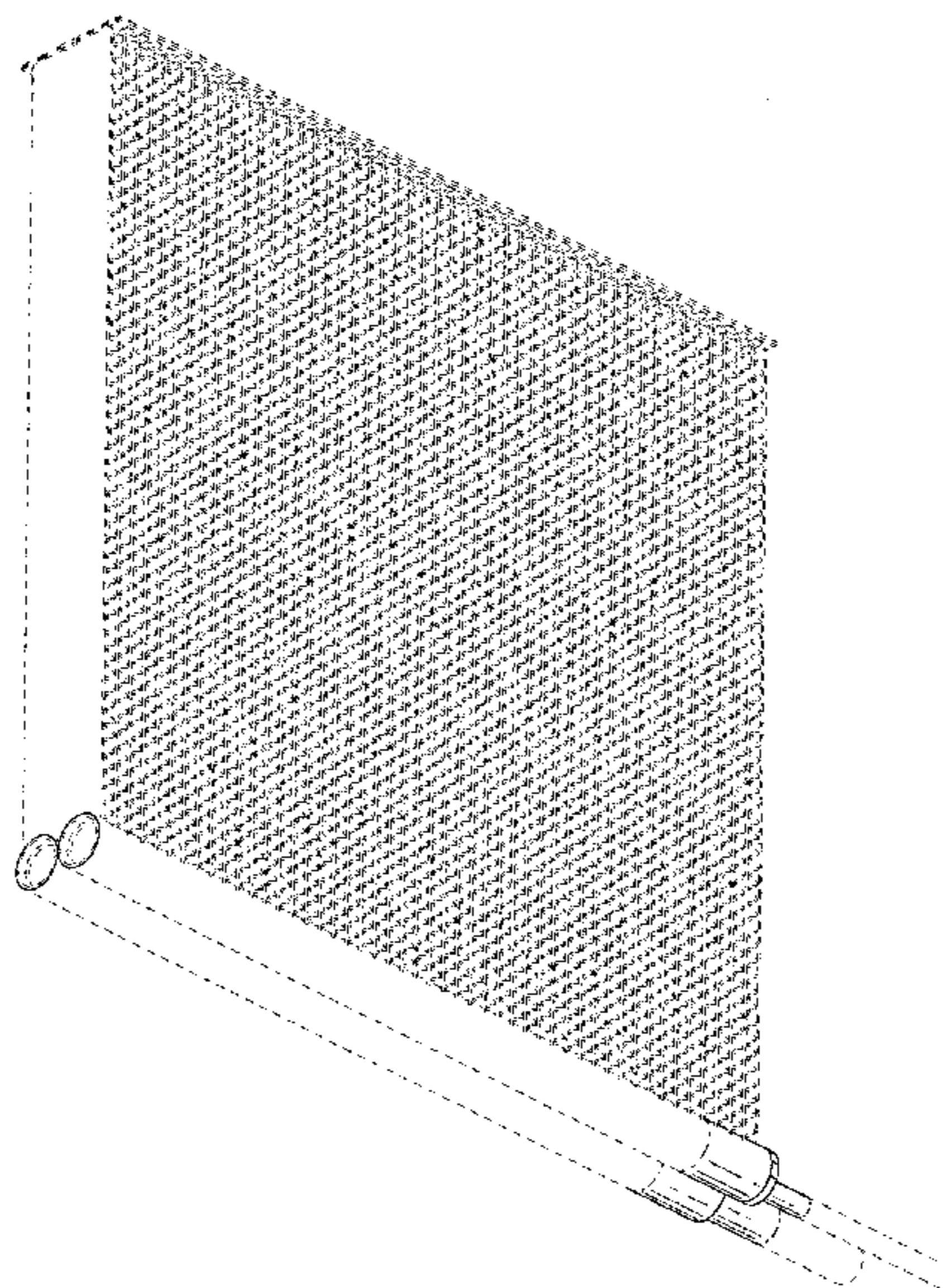
FIG. 6 is a rear view of the heat exchanger shown in FIG. 1; and,

FIG. 7 is a front view of the heat exchanger shown in FIG. 1.

The elements shown in broken lines are included for the purpose of illustrating environment and form no part of the claimed design. The portions shown in broken lines having unequal length segments illustrate the boundary of the claimed design and form no part of the claimed design.

(Continued)

1 Claim, 5 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

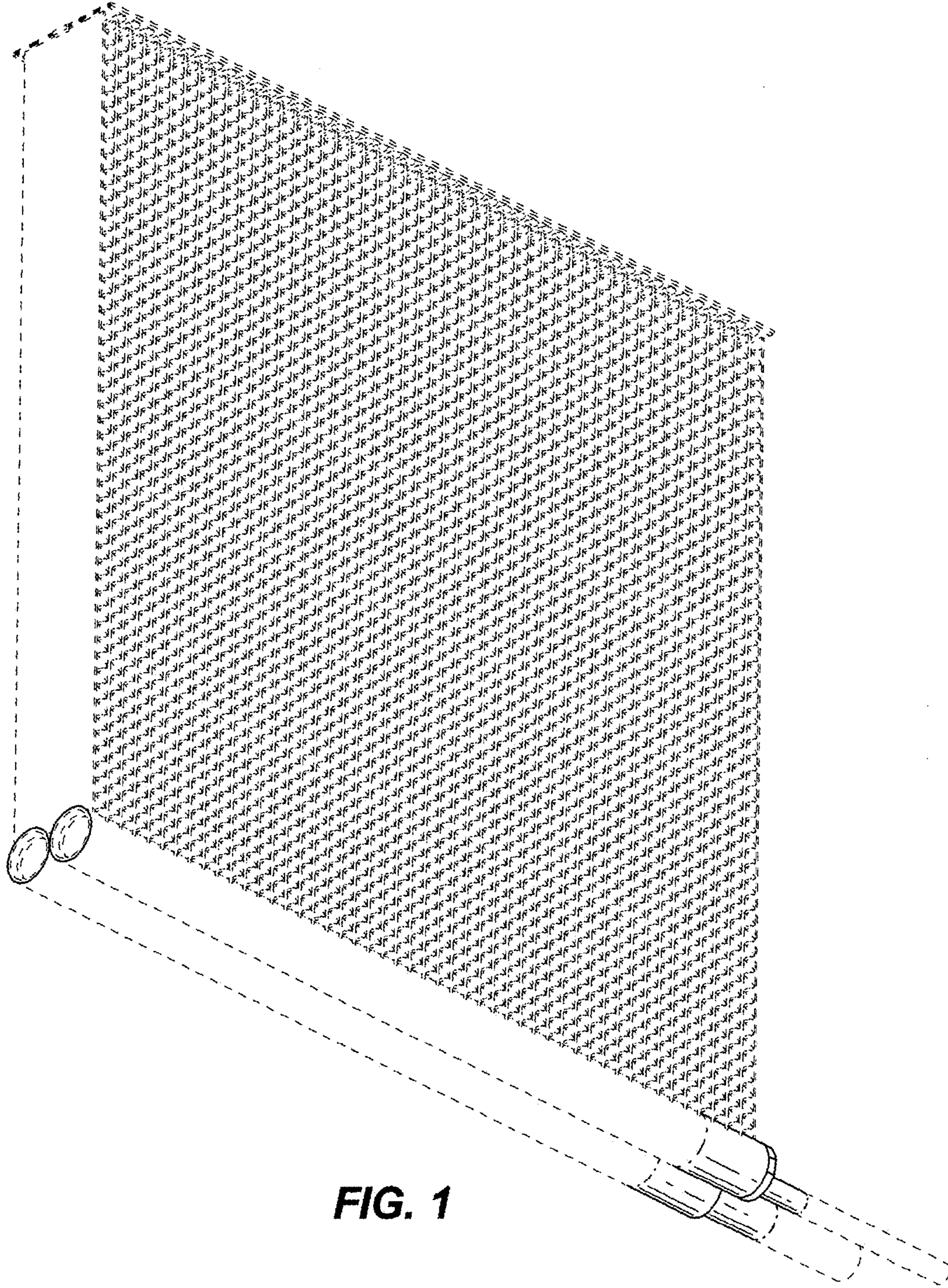
5,787,973 A 8/1998 Kado et al.
 6,161,616 A 12/2000 Haussmann
 6,460,610 B2 10/2002 Lambert et al.
 6,749,015 B2 6/2004 Moreau
 6,814,136 B2* 11/2004 Yi et al. 165/153
 6,827,139 B2 12/2004 Kawakubo et al.
 6,988,544 B2 1/2006 Ozaki et al.
 7,044,208 B2 5/2006 Kawakubo et al.
 7,143,512 B2* 12/2006 Kroetsch et al. 29/890.039
 7,293,604 B2 11/2007 Sasaki et al.
 7,426,958 B2 9/2008 Yu
 7,481,266 B2 1/2009 Demuth et al.
 7,607,473 B2 10/2009 Ichianagi
 7,637,314 B2 12/2009 Park et al.
 7,650,935 B2* 1/2010 Demuth et al. 165/176
 7,798,206 B2* 9/2010 Hirano et al. 165/173
 7,832,463 B2* 11/2010 Bergmiller et al. 165/149
 8,100,171 B2 1/2012 Zebuhr
 8,181,694 B2 5/2012 Powers et al.
 8,196,646 B2* 6/2012 Huang et al. 165/135
 8,235,099 B2* 8/2012 Higashiyama 165/174
 8,261,567 B2* 9/2012 Zangari et al. 62/255
 8,296,948 B2 10/2012 Lesage

8,322,407 B2 12/2012 Reynolds
 8,353,330 B2* 1/2013 Lim et al. 165/76
 8,371,366 B2* 2/2013 Higashiyama et al. 165/176
 8,561,678 B2 10/2013 Richardson et al.
 8,590,607 B2 11/2013 Demuth et al.
 2003/0221819 A1* 12/2003 Jang 165/173
 2005/0039901 A1* 2/2005 Demuth et al. 165/175
 2005/0103486 A1* 5/2005 Demuth et al. 165/174
 2005/0217838 A1 10/2005 Katoh et al.
 2006/0086486 A1* 4/2006 Sudo 165/143
 2006/0162917 A1 7/2006 Park et al.
 2007/0131391 A1* 6/2007 Ichianagi 165/110
 2007/0251682 A1* 11/2007 Sasaki 165/153
 2009/0236086 A1* 9/2009 Higashiyama et al. 165/176
 2009/0314475 A1* 12/2009 Jeon et al. 165/109.1
 2010/0147498 A1* 6/2010 Huang et al. 165/151
 2010/0319379 A1* 12/2010 Zangari et al. 62/255
 2011/0192582 A1* 8/2011 Knight et al. 165/173
 2013/0199760 A1* 8/2013 Kadle et al. 165/152

OTHER PUBLICATIONS

Extended European Search Report for European Application No. 11002633.3 dated Feb. 28, 2014 (8 pages).

* cited by examiner



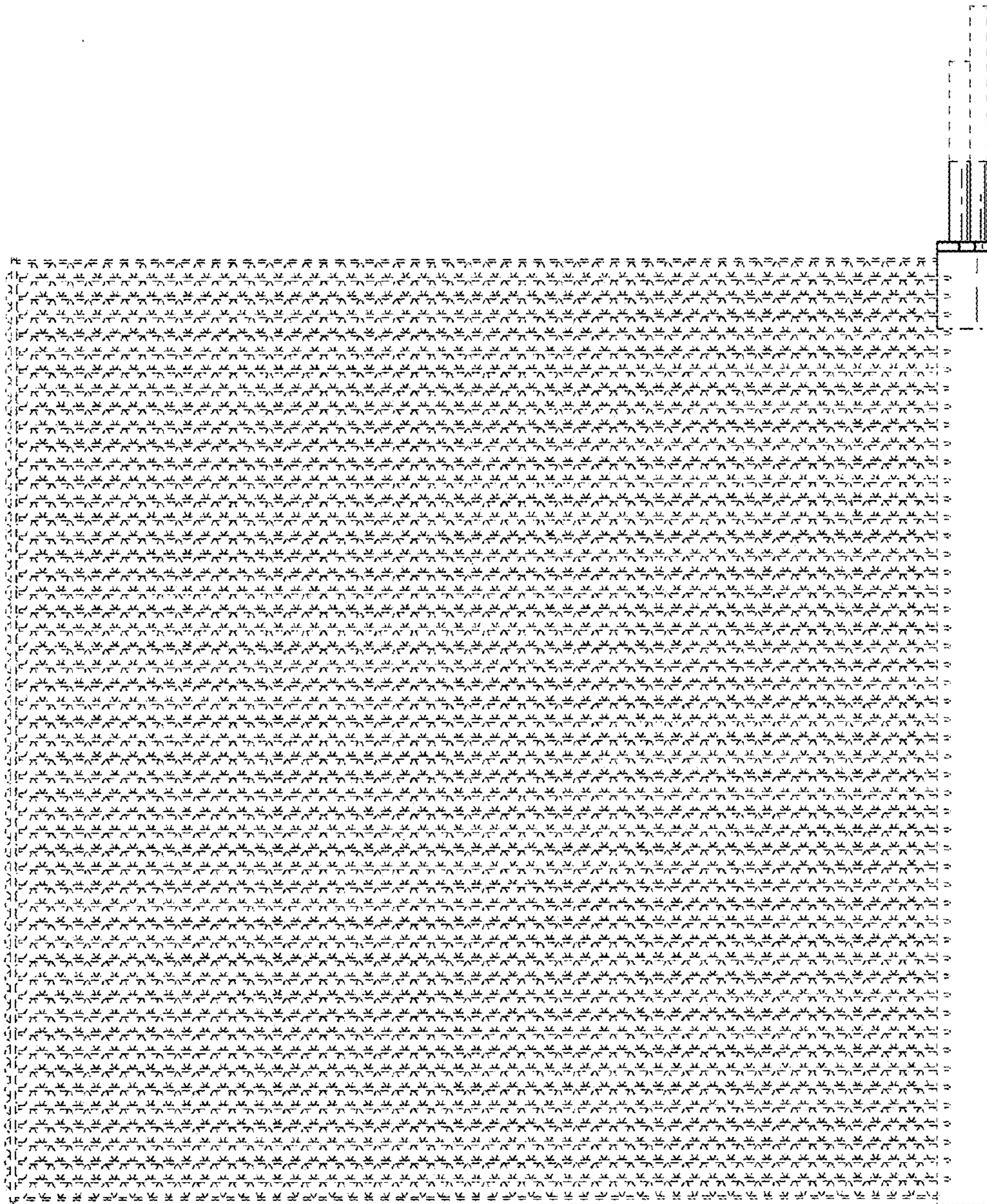


FIG. 2

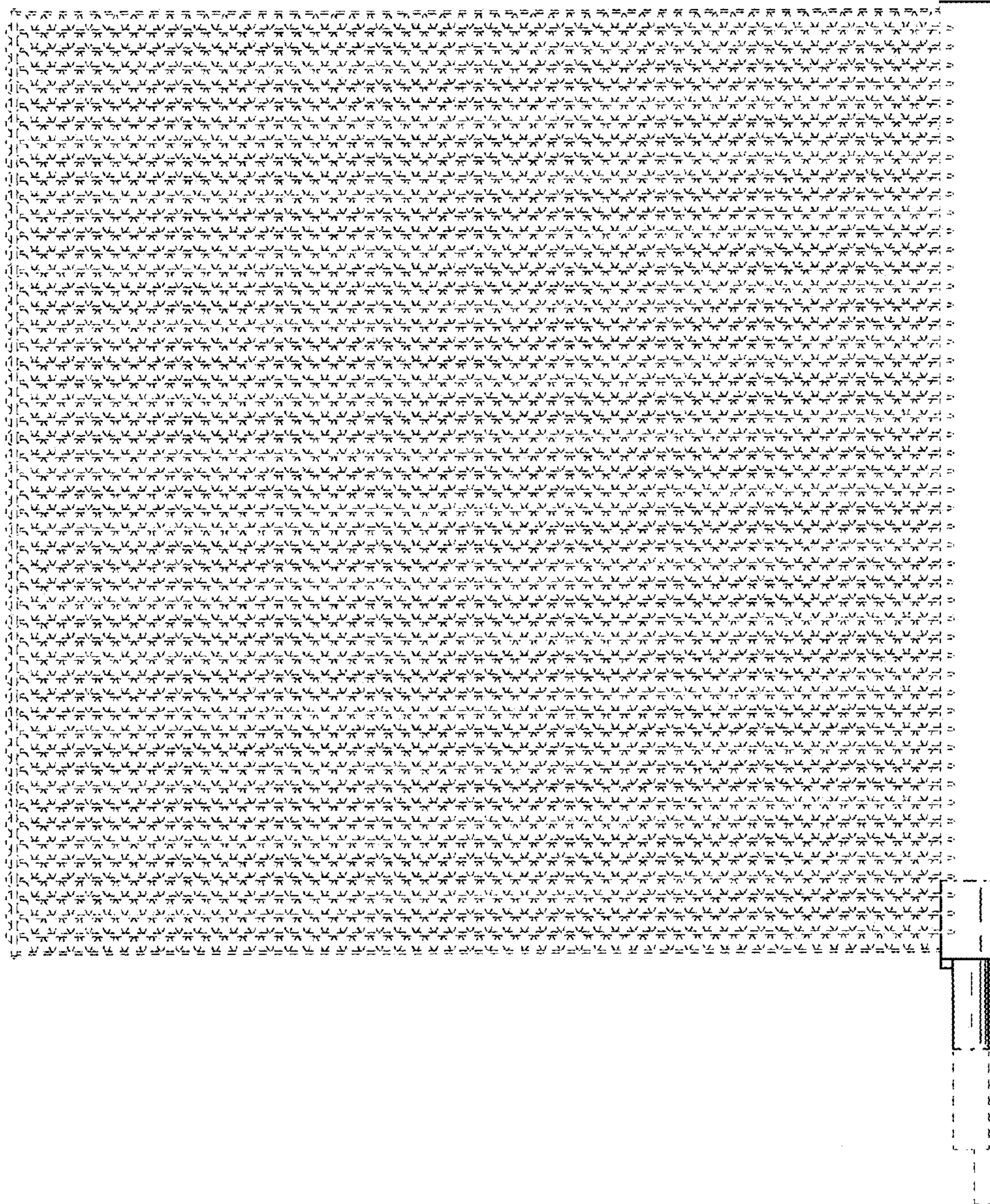


FIG. 3

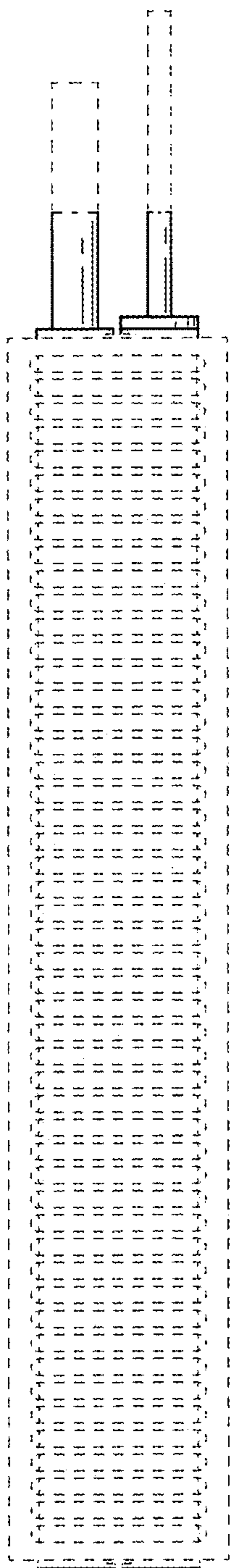


FIG. 4

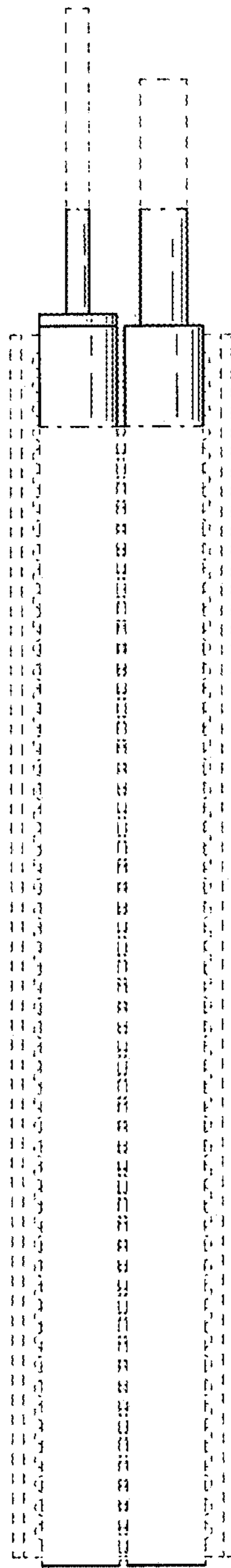


FIG. 5

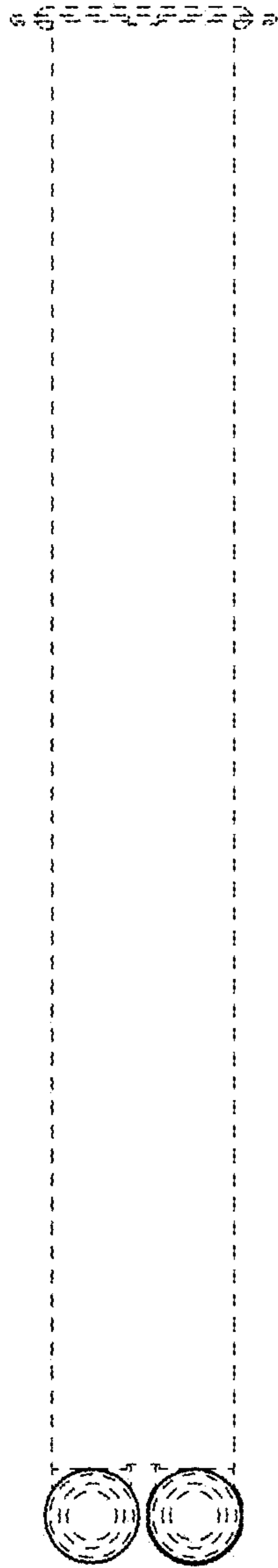


FIG. 6

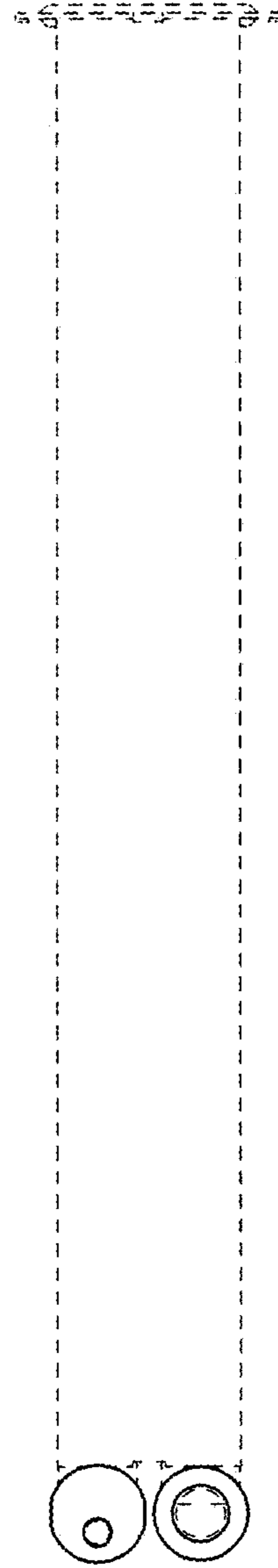


FIG. 7