



US00D557332S

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

(10) **Patent No.:** **US D557,332 S**  
(45) **Date of Patent:** **\*\* Dec. 11, 2007**

(54) **INK JET LIQUID INJECTOR**

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

(21) Appl. No.: **29/222,350**

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**Related U.S. Application Data**

(62) Division of application No. 29/177,390, filed on Mar. 11, 2003, now Pat. No. Des. 514,618.

(30) **Foreign Application Priority Data**

Sep. 12, 2002	(JP)	.....	2002-024869
Sep. 12, 2002	(JP)	.....	2002-024870
Sep. 12, 2002	(JP)	.....	2002-024871
Sep. 12, 2002	(JP)	.....	2002-024872

(51) **LOC (8) Cl.** ..... **18-02**

(52) **U.S. Cl.** ..... **D18/56; 347/86**

(58) **Field of Classification Search** ..... D18/12,  
D18/18, 40, 43, 56; 347/33, 37, 40, 42, 70,  
347/85-87, 256; 399/110

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,897,903 A 2/1990 Johannsen

(Continued)

**FOREIGN PATENT DOCUMENTS**

JP	D1210295	*	6/2004
JP	D1210296	*	6/2004

*Primary Examiner*—Cathy Anne MacCormac

(74) *Attorney, Agent, or Firm*—Oliff & Berridge, PLC

(57) **CLAIM**

The ornamental design for an ink jet liquid injector, as shown and described.

**DESCRIPTION**

FIG. 1 is a front view showing an ink jet liquid injector according to a first embodiment of the present invention;

FIG. 2 is a rear view thereof;

FIG. 3 is a top plan view thereof;

FIG. 4 is a bottom plan view thereof;

FIG. 5 is a right side view thereof;

FIG. 6 is a left side view thereof;

FIG. 7 is an enlarged view showing a portion of FIG. 1 defined by crop lines 7-7;

FIG. 8 is an enlarged view showing a portion of FIG. 3 defined by crop lines 8-8;

FIG. 9 is an enlarged view showing a portion of FIG. 6 defined by crop lines 9-9;

FIG. 10 is a perspective view thereof;

FIG. 11 is a front view showing an ink jet liquid injector according to a second embodiment of the present invention;

FIG. 12 is a rear view of FIG. 11;

FIG. 13 is a top plan view of FIG. 11;

FIG. 14 is a bottom plan view of FIG. 11;

FIG. 15 is a right side view of FIG. 11;

FIG. 16 is a left side view of FIG. 11;

FIG. 17 is an enlarged view showing a portion of FIG. 11 defined by crop lines 17-17;

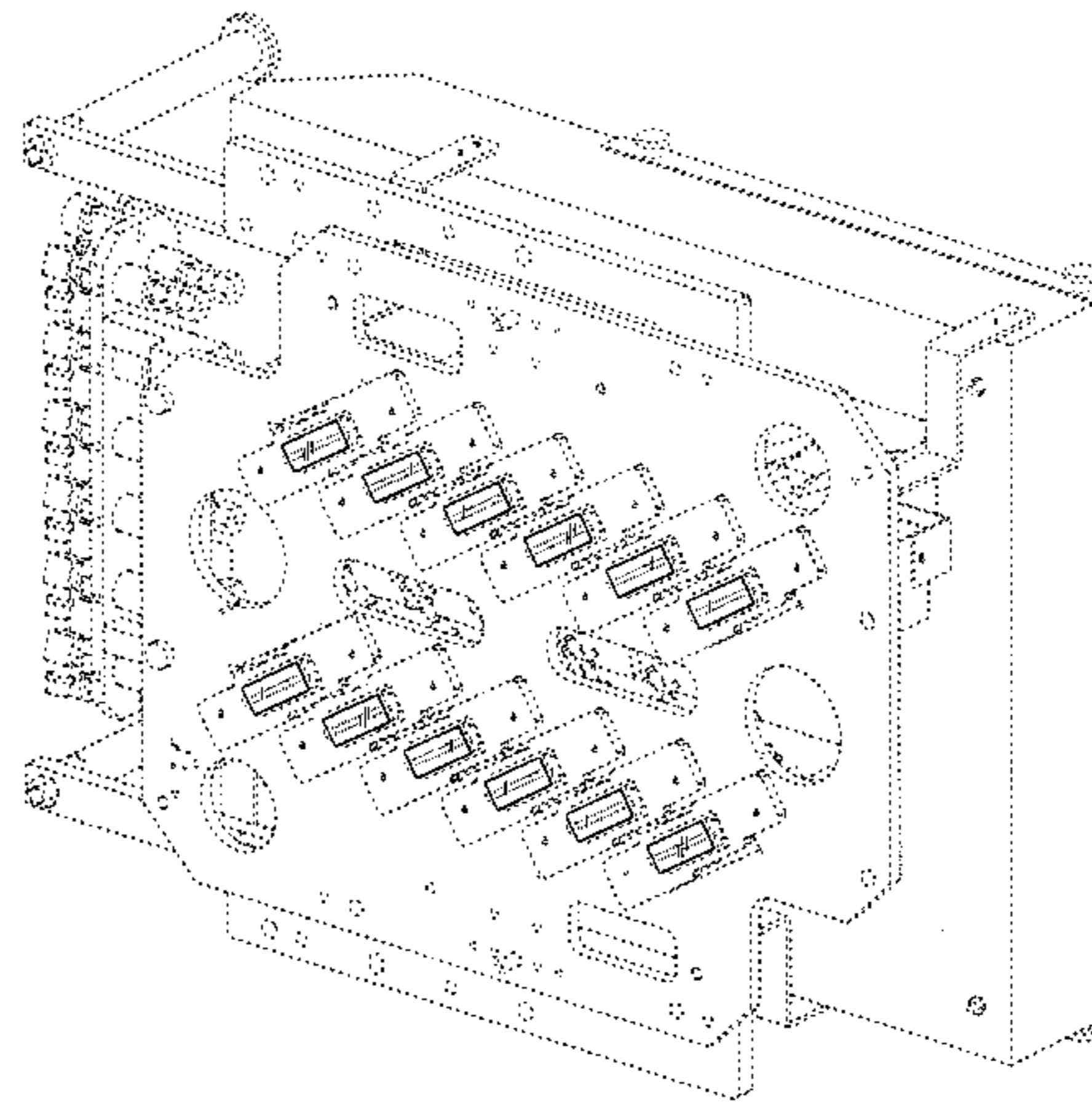
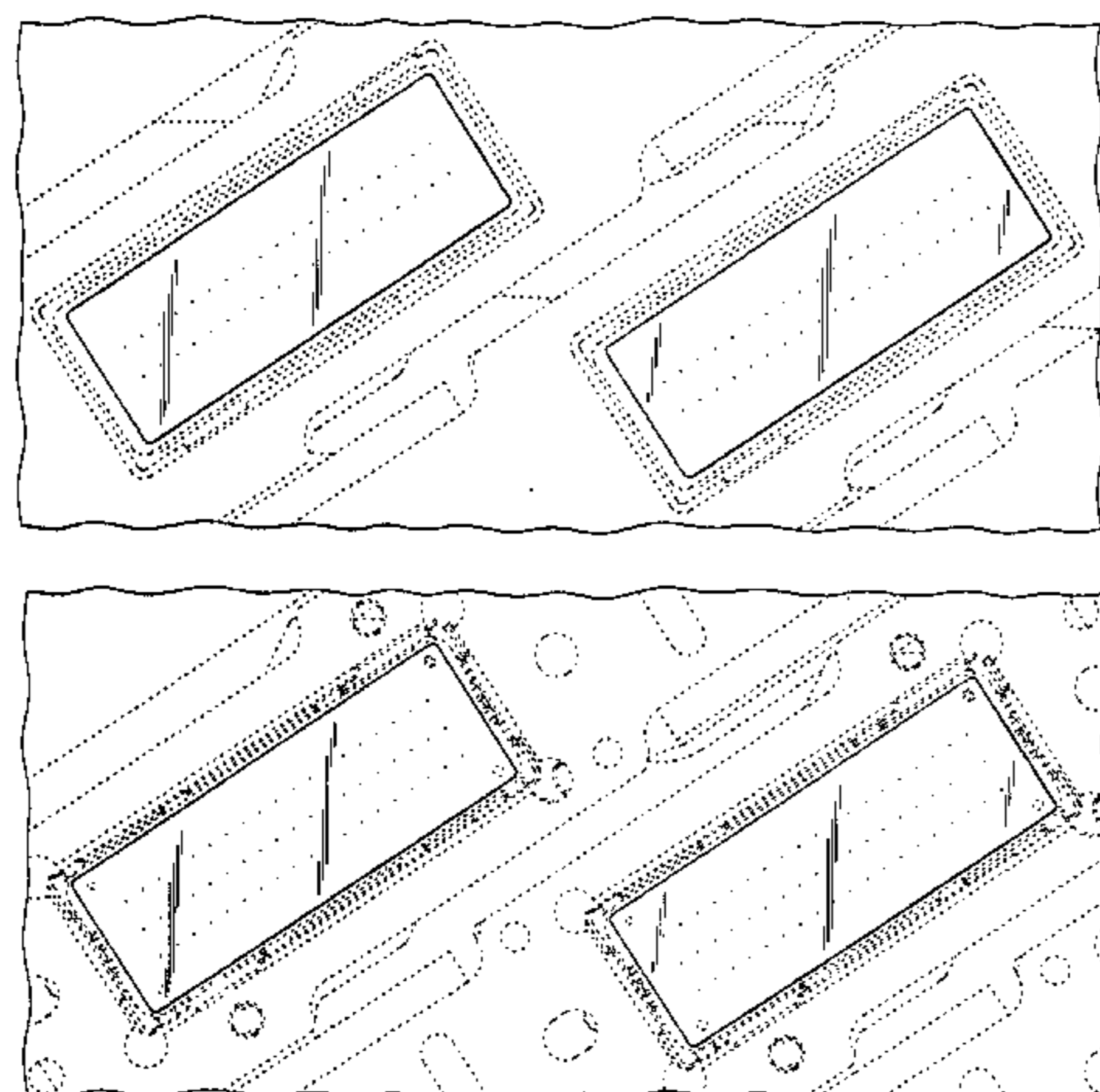
FIG. 18 is an enlarged view showing a portion of FIG. 13 defined by crop lines 18-18;

FIG. 19 is an enlarged view showing a portion of FIG. 16 defined by crop lines 19-19; and,

FIG. 20 is a perspective view of FIG. 11.

The broken lines in each drawing are shown for illustrative purposes only and form no part of the claimed design. More specifically, the claimed designs are directed to the liquid injection heads. Further, the dots shown in each head represent liquid injection ports and do not form part of the claimed design.

**1 Claim, 12 Drawing Sheets**



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## U.S. PATENT DOCUMENTS

5,016,023	A *	5/1991	Chan et al. ....	347/42	6,783,207	B1	8/2004	Seto et al.	
5,734,394	A *	3/1998	Hackleman .....	347/42	6,863,370	B2 *	3/2005	Ogawa et al. ....	347/40
6,250,738	B1 *	6/2001	Waller et al. ....	347/42	6,871,943	B2 *	3/2005	Ogawa .....	347/84
6,520,624	B1 *	2/2003	Horvath et al. ....	347/42	6,910,762	B2 *	6/2005	Nakamura .....	347/85
6,557,976	B2 *	5/2003	McElfresh et al. ....	347/50	6,933,958	B2 *	8/2005	Nakamura et al. ....	347/256
6,575,559	B2 *	6/2003	McElfresh et al. ....	347/50	6,991,680	B2 *	1/2006	Kojima .....	347/33
6,736,484	B2	5/2004	Nakamura		2004/0021730	A1 *	2/2004	Yamane .....	347/40
6,746,103	B2 *	6/2004	Tanuma .....	347/40	2004/0201641	A1 *	10/2004	Brugue et al. ....	347/40
6,758,550	B2	7/2004	Ito et al.		2004/0218002	A1 *	11/2004	Nakamura .....	347/33
6,773,084	B1	8/2004	Wehl et al.		2004/0257399	A1 *	12/2004	Iwata .....	347/40

\* cited by examiner

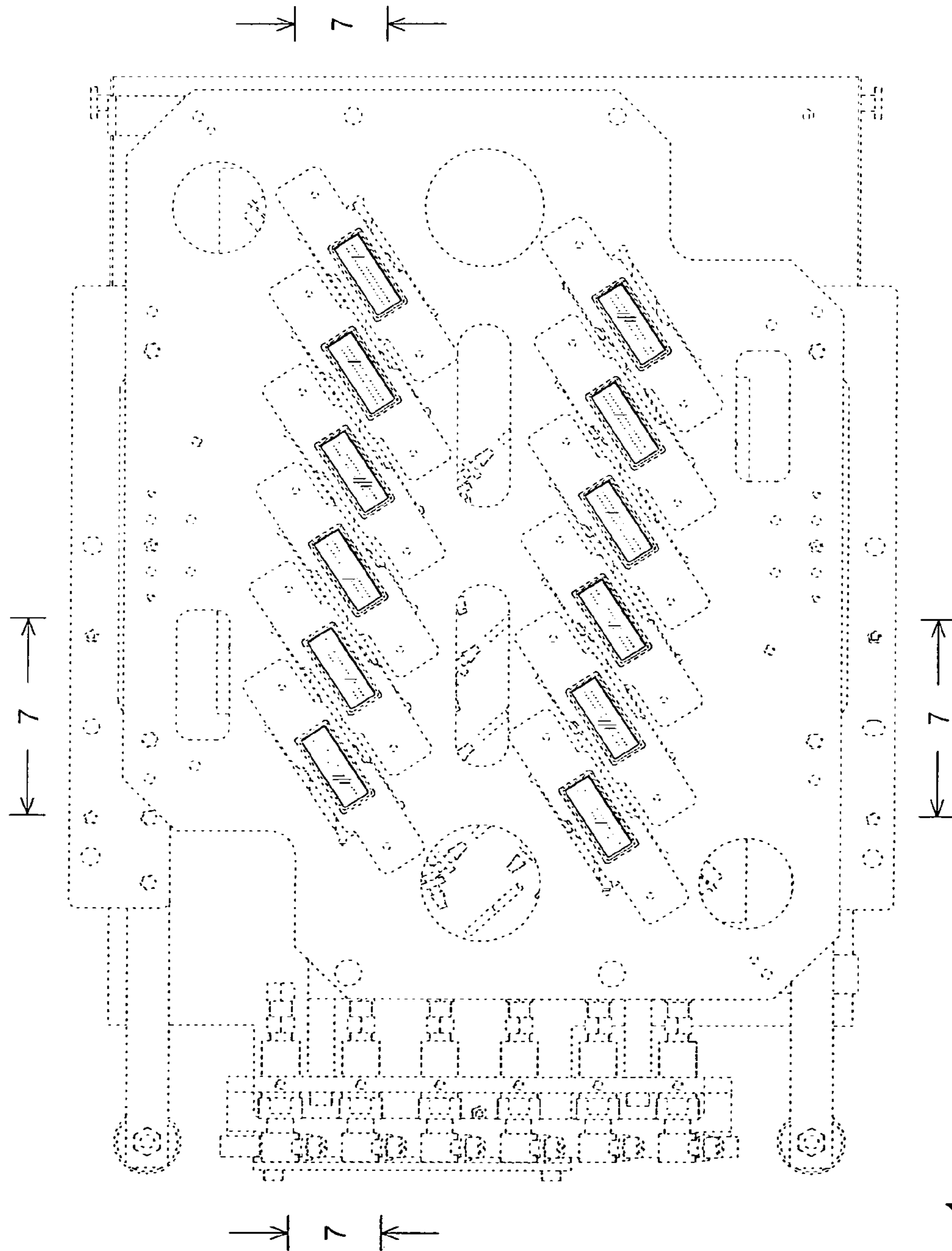


Fig. 1

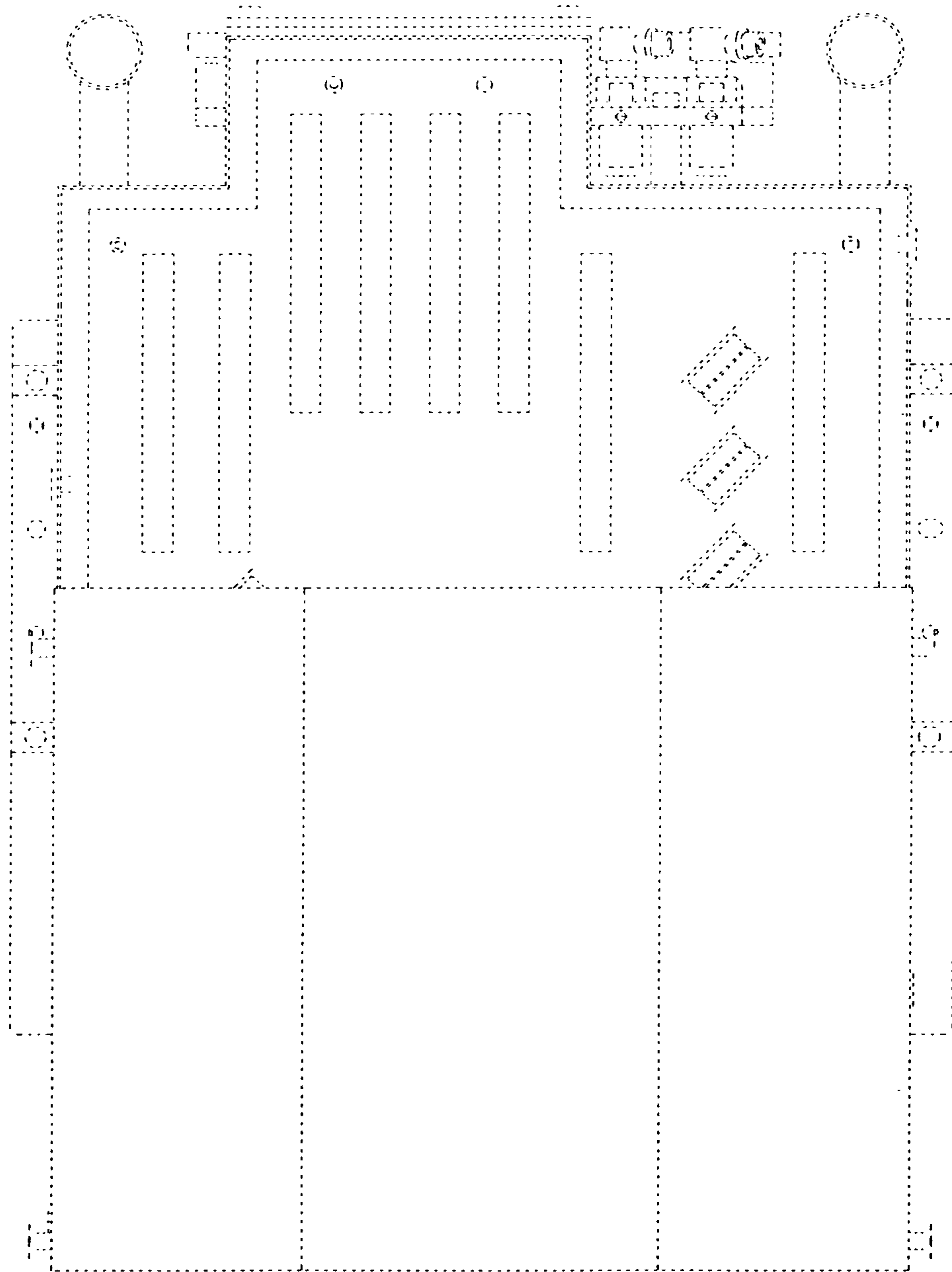


Fig. 2

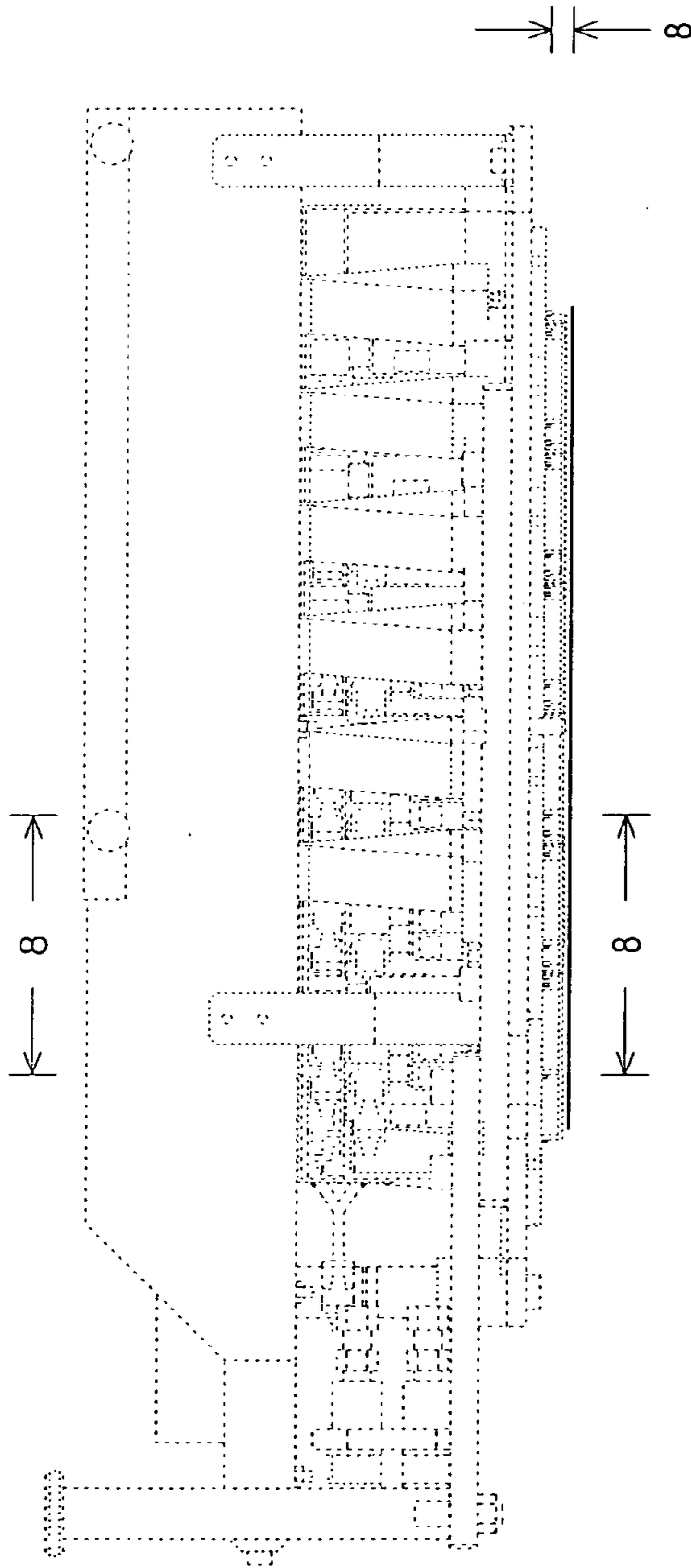


Fig. 3

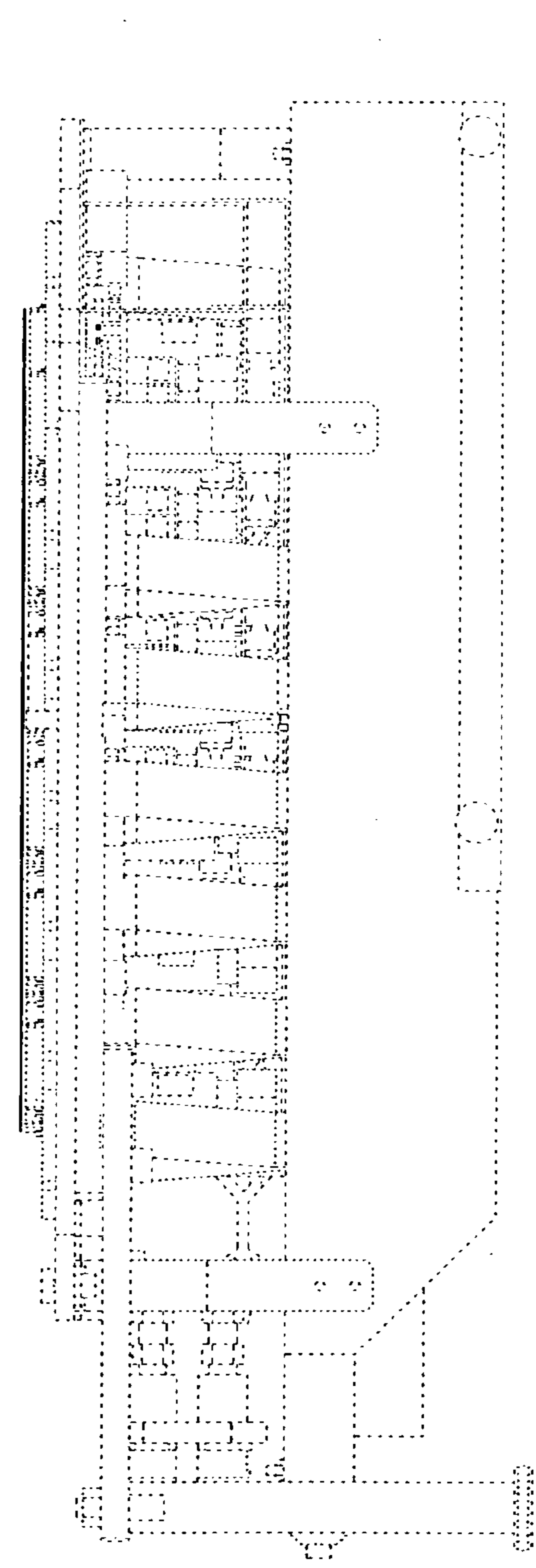


Fig. 4

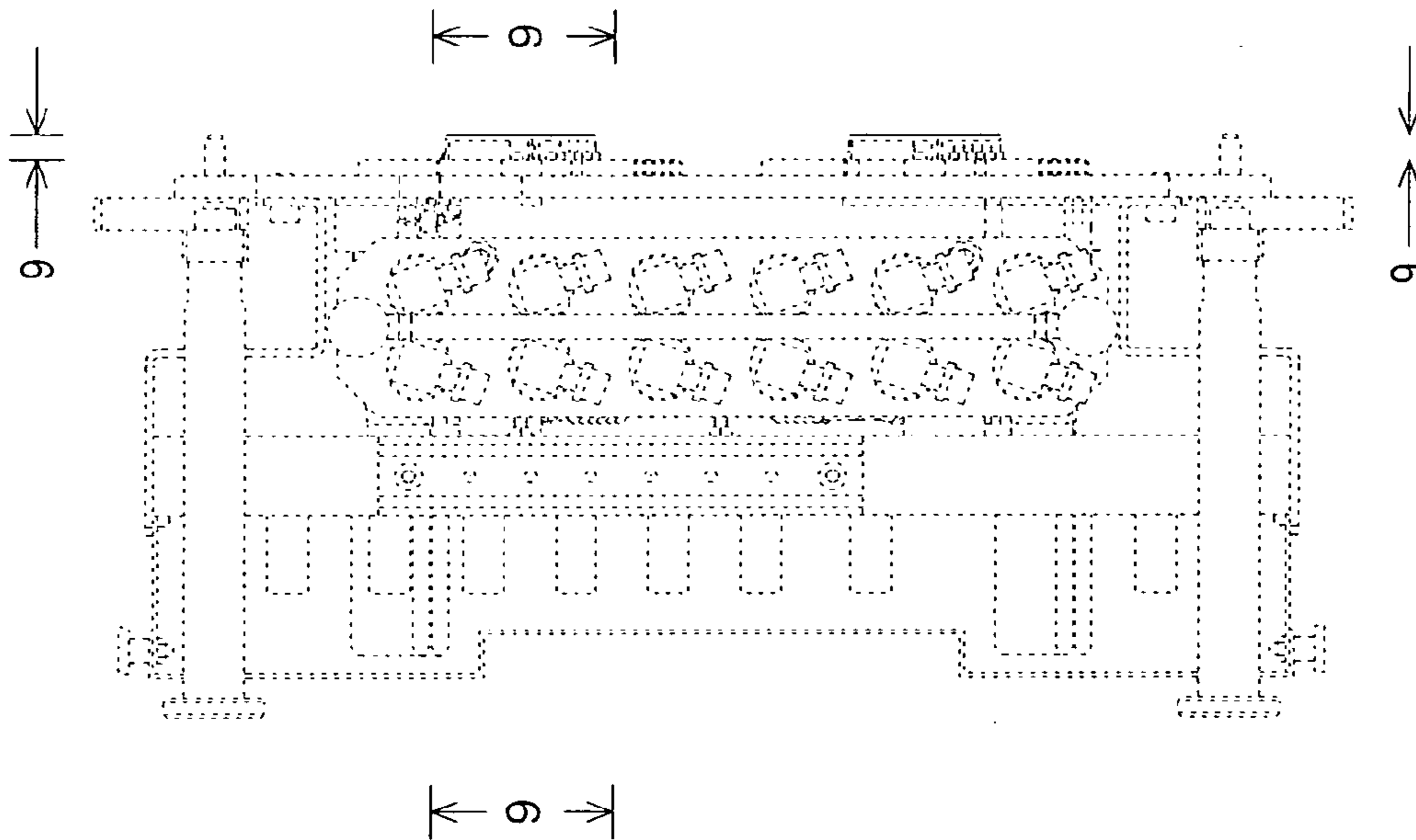


Fig. 6

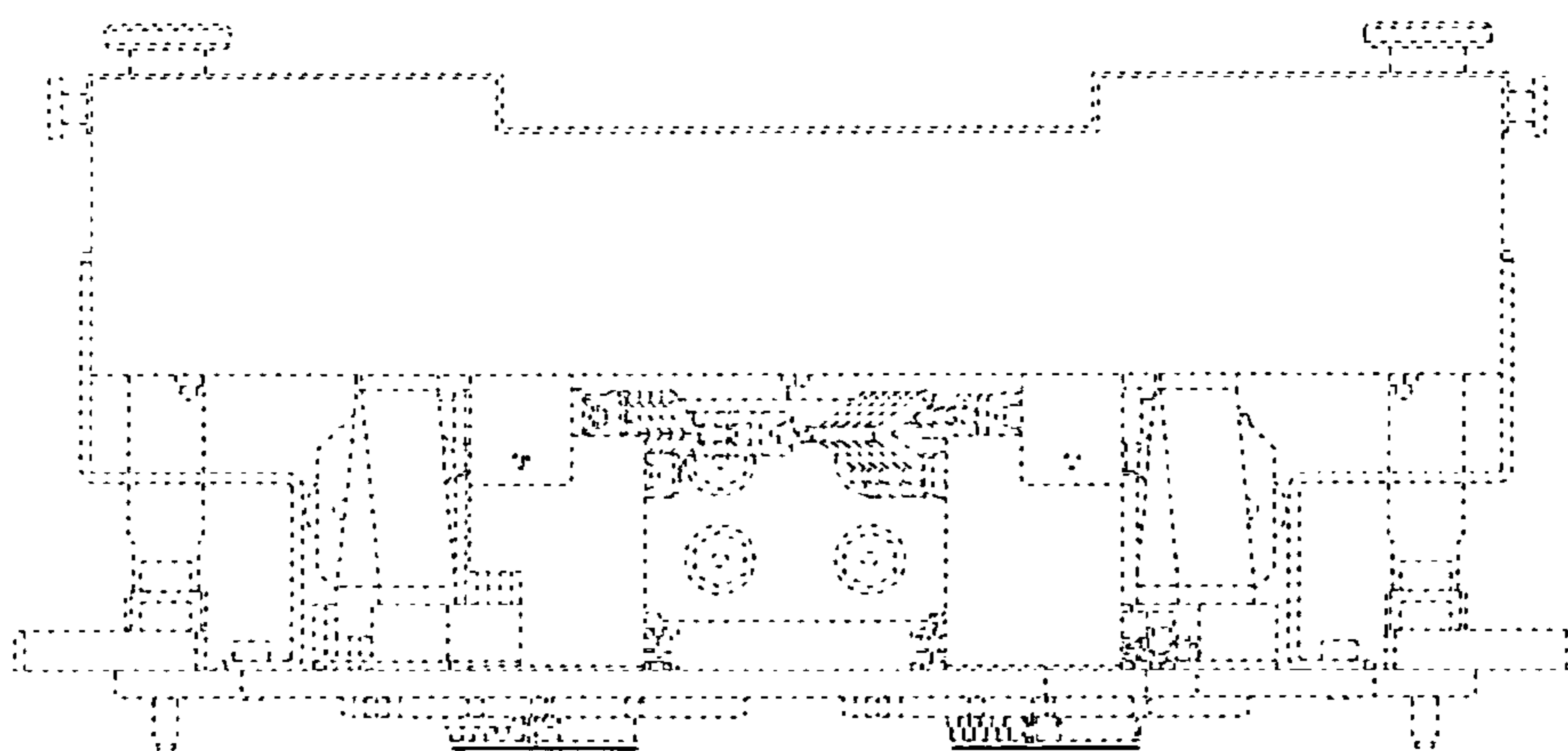


Fig. 5

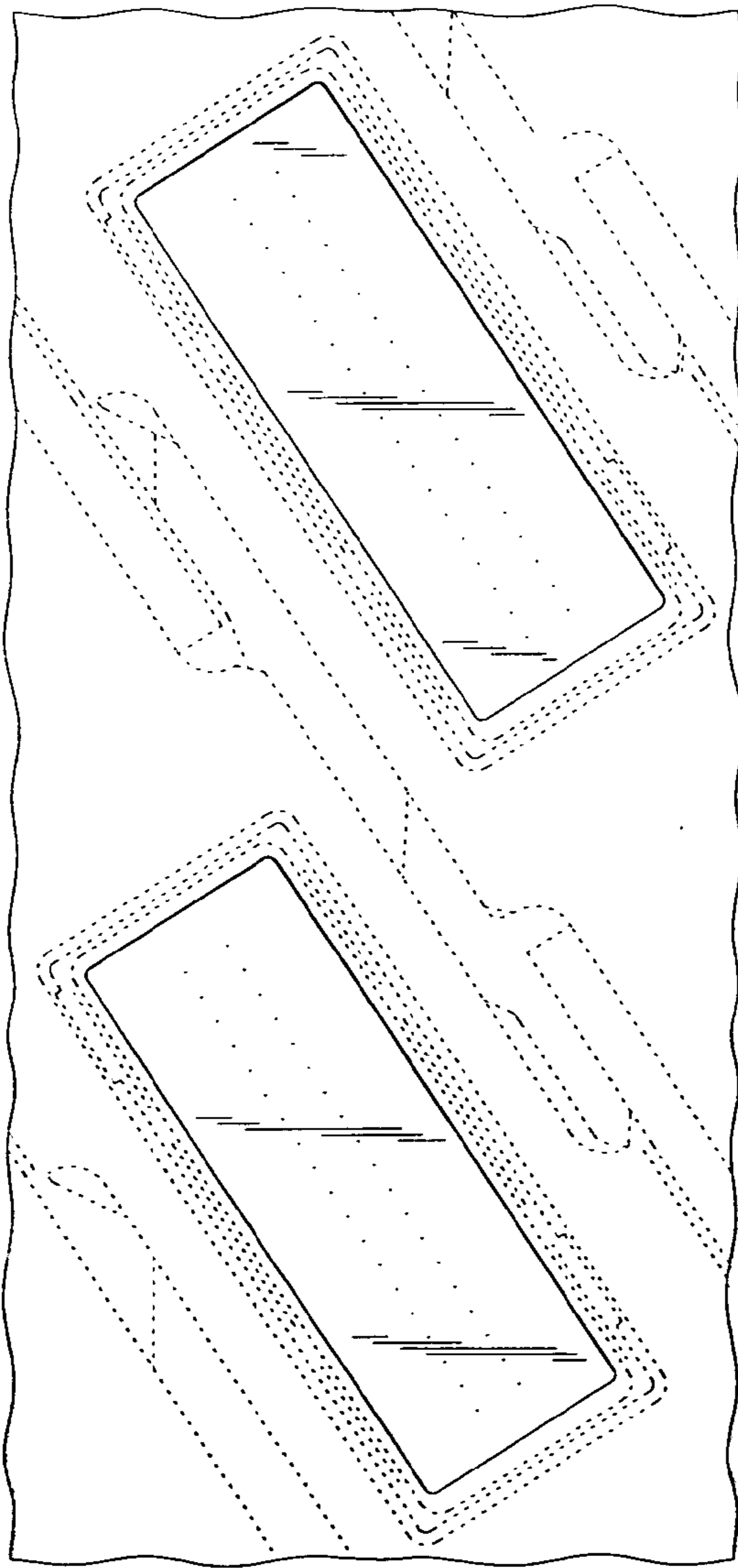


Fig. 7

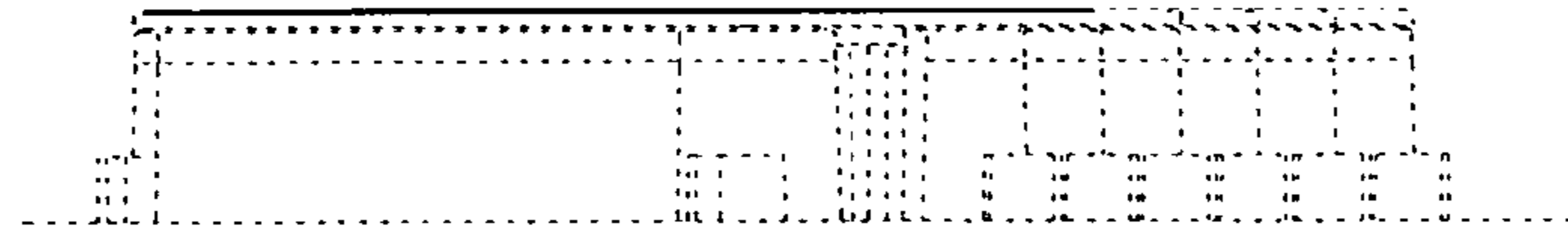


Fig. 9

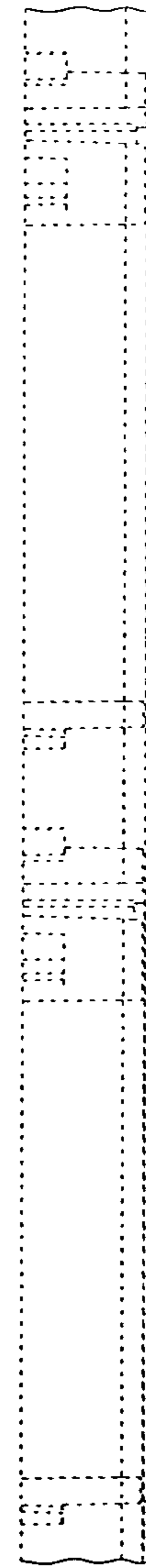


Fig. 8

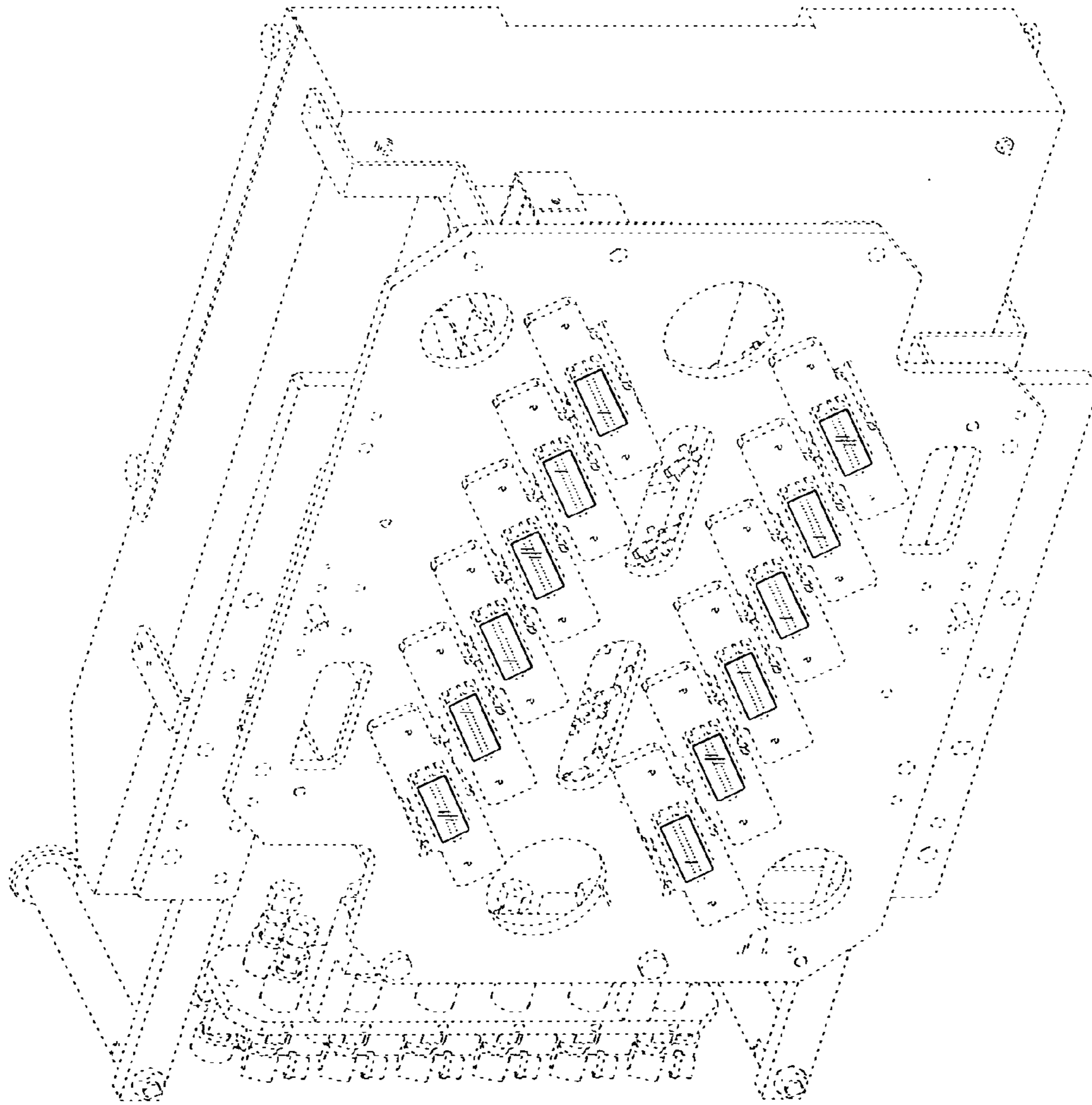


Fig. 10



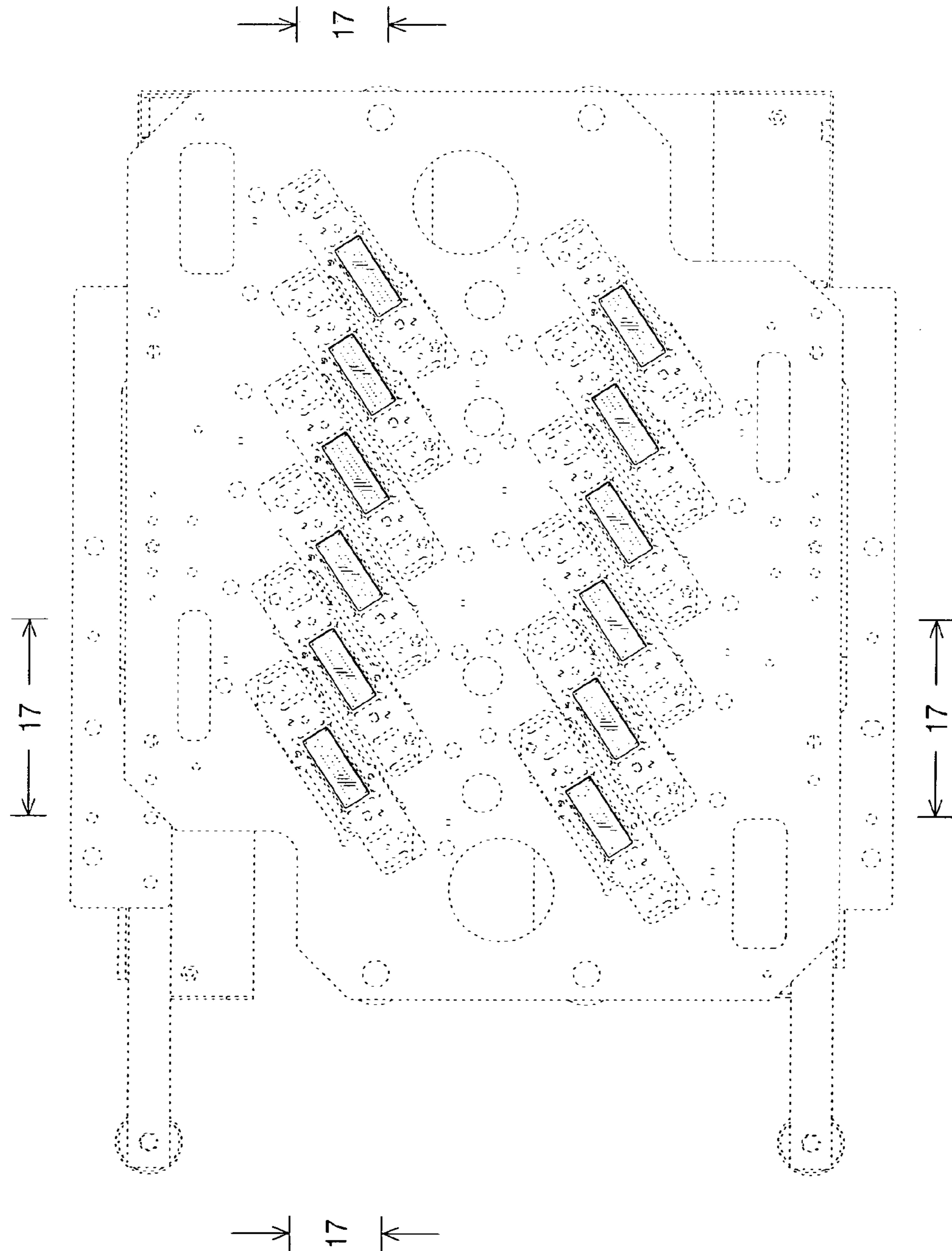


Fig. 11

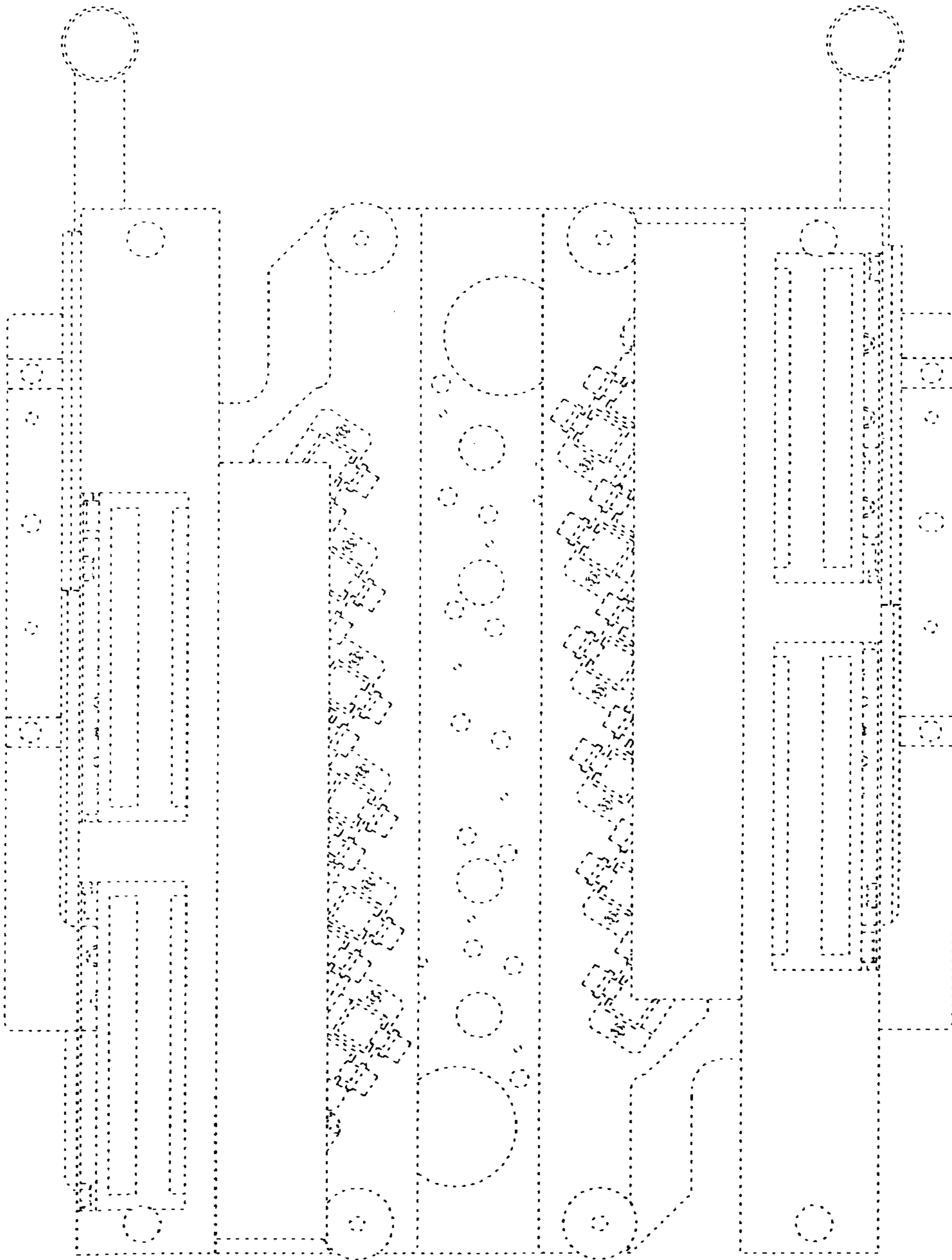


Fig. 12

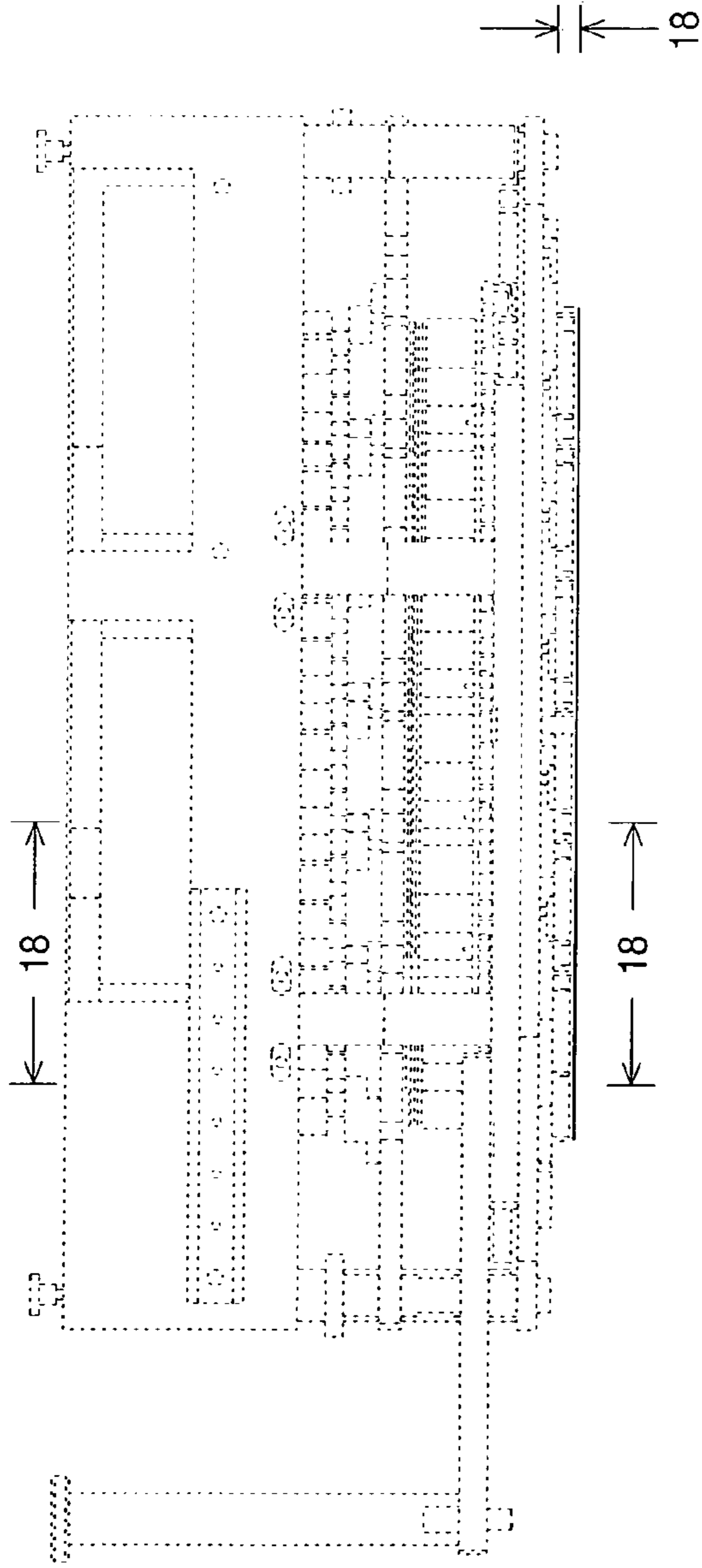


Fig. 13

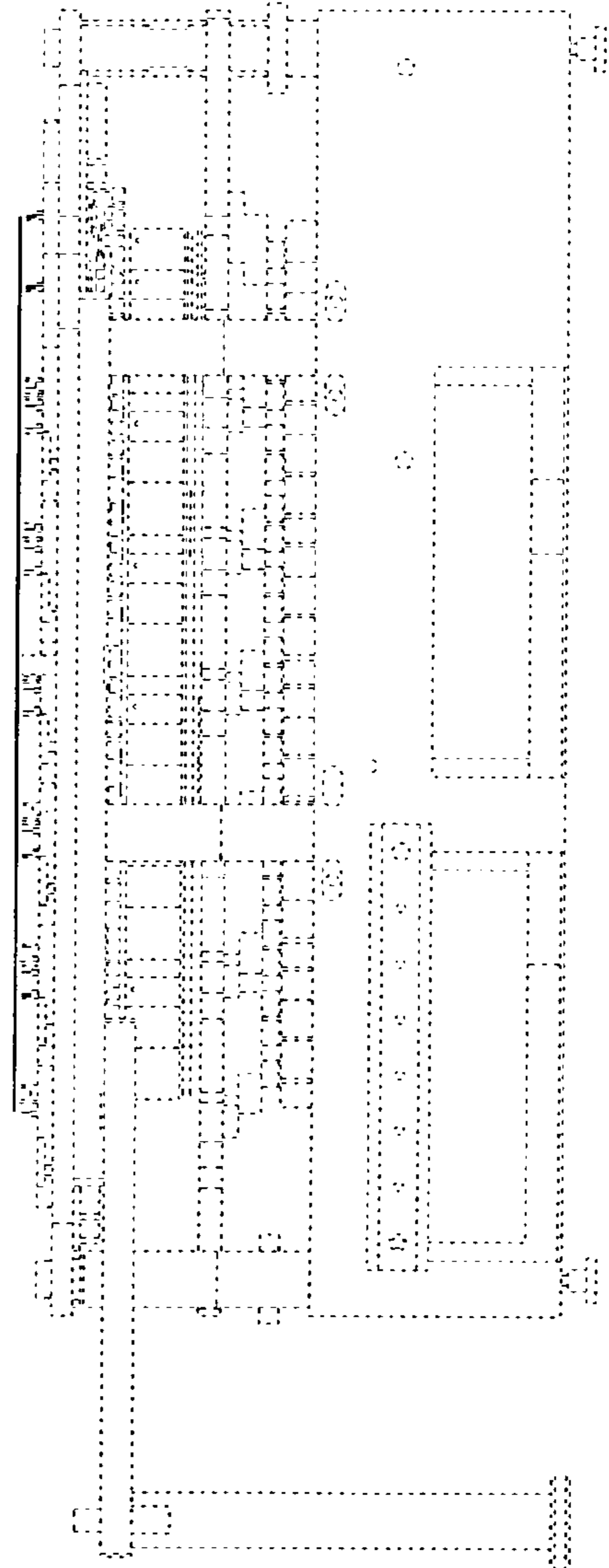


Fig. 14

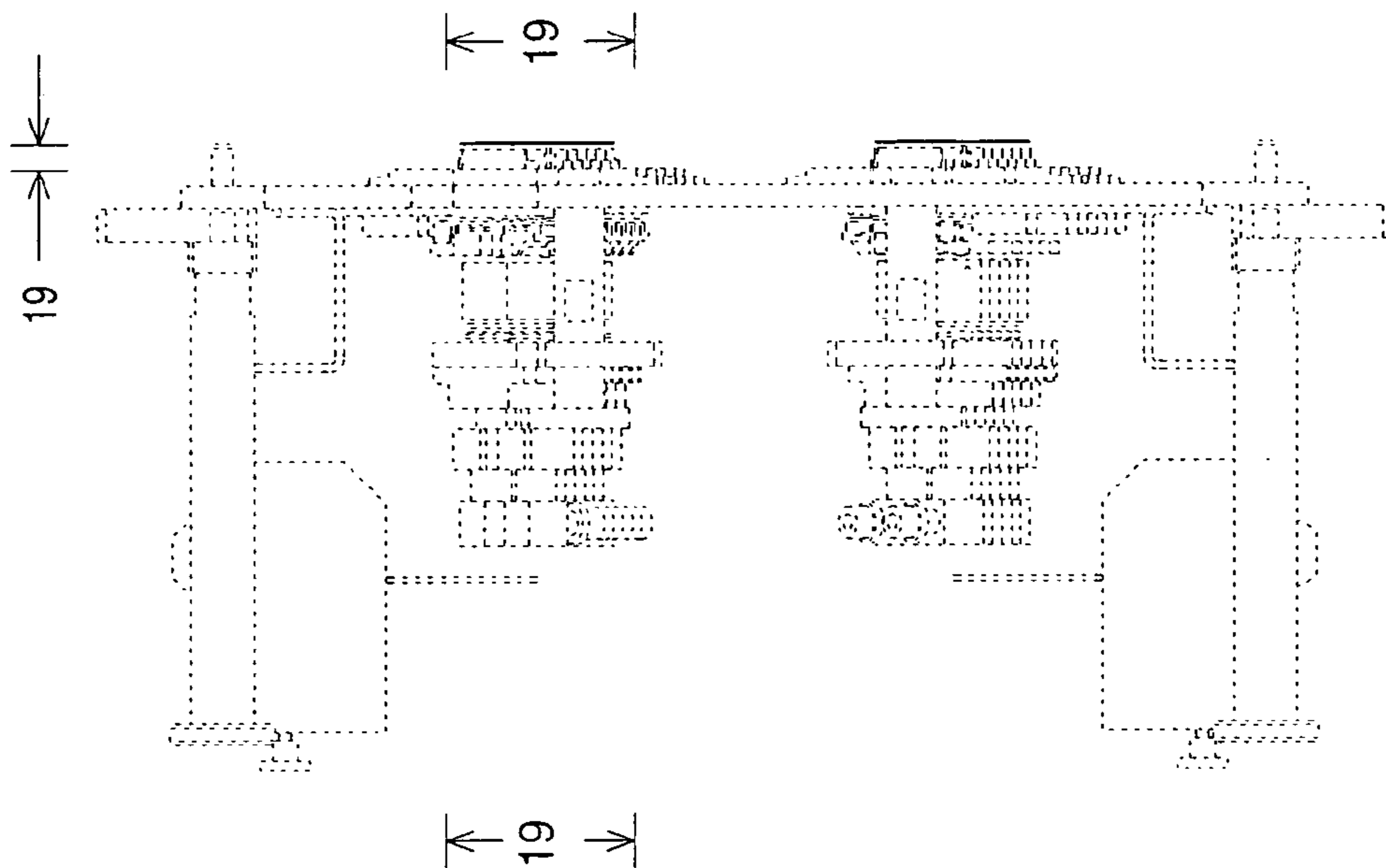


Fig. 16

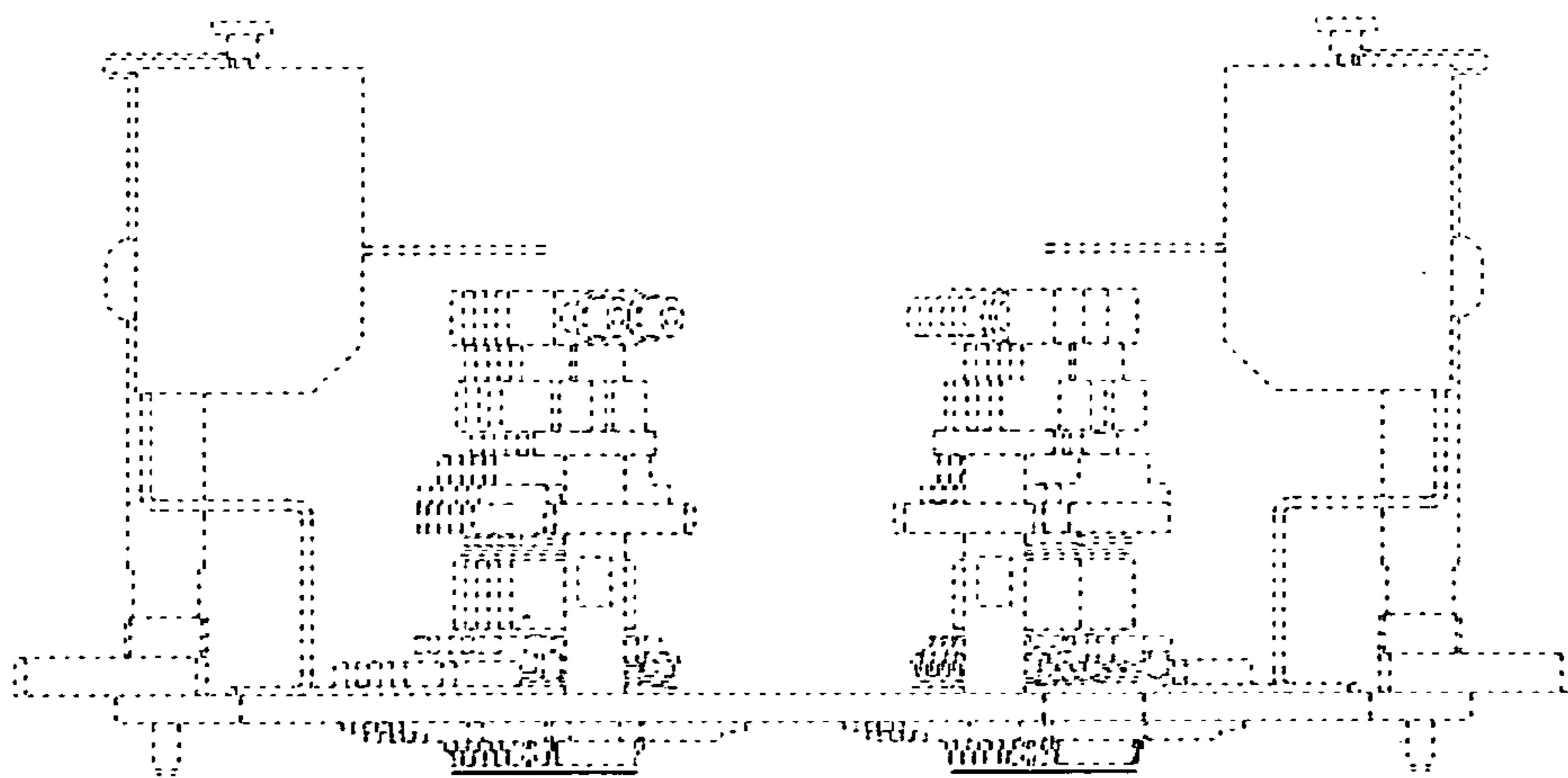


Fig. 15

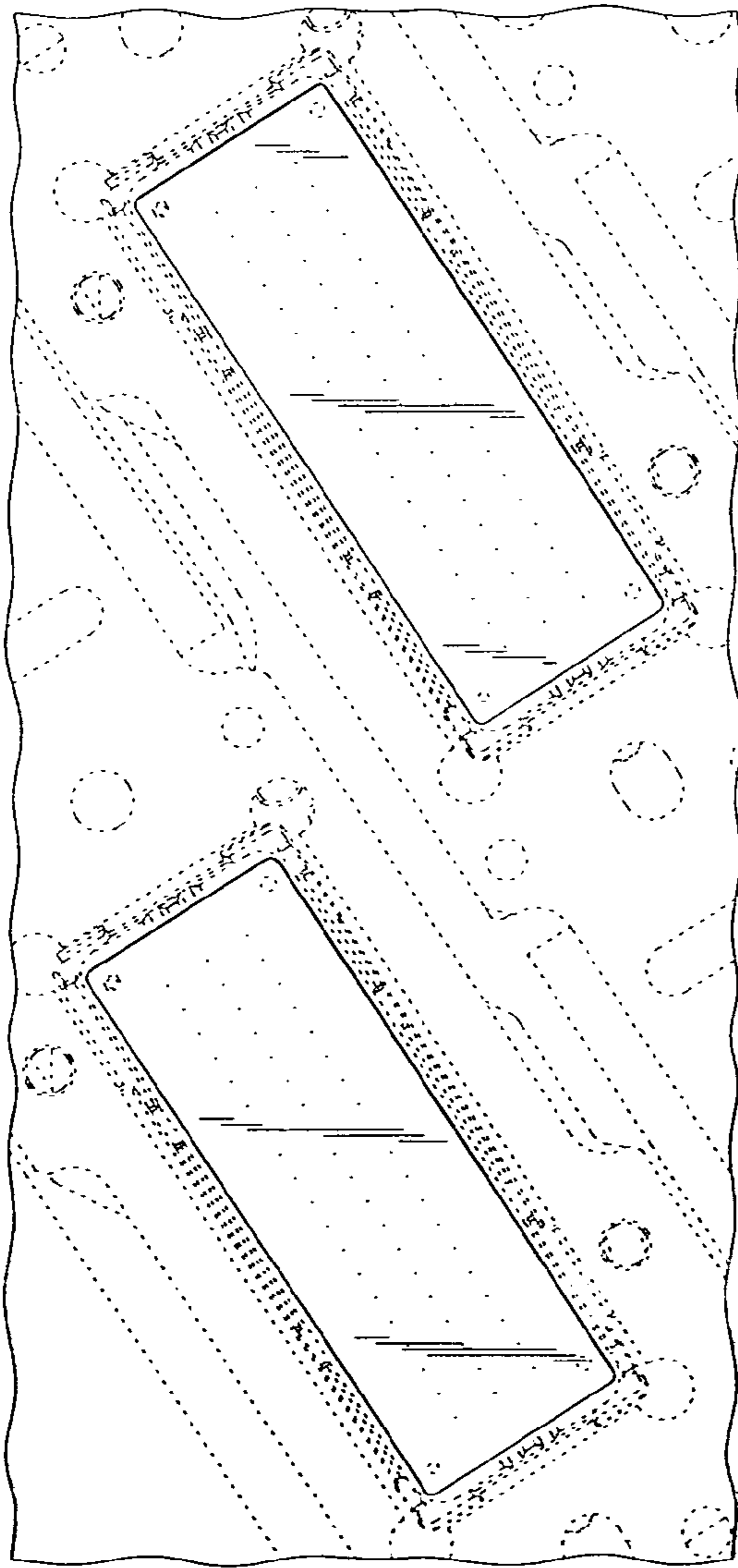


Fig. 17

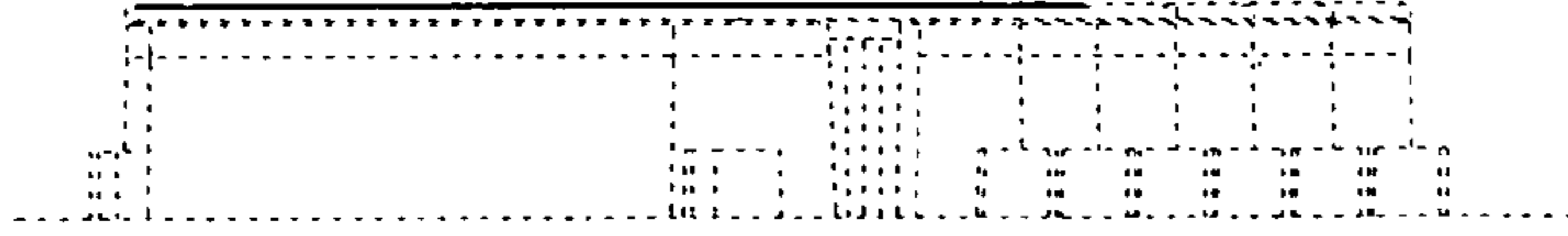


Fig. 19

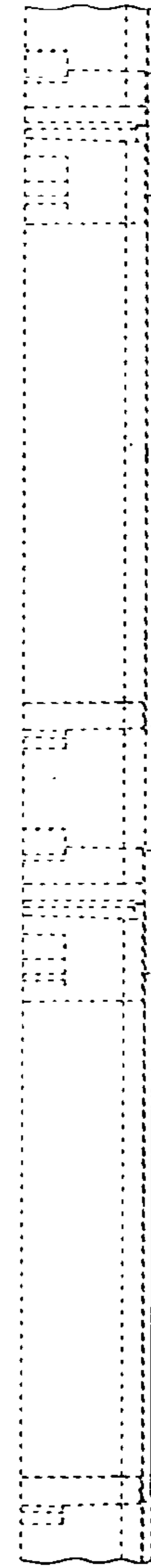


Fig. 18

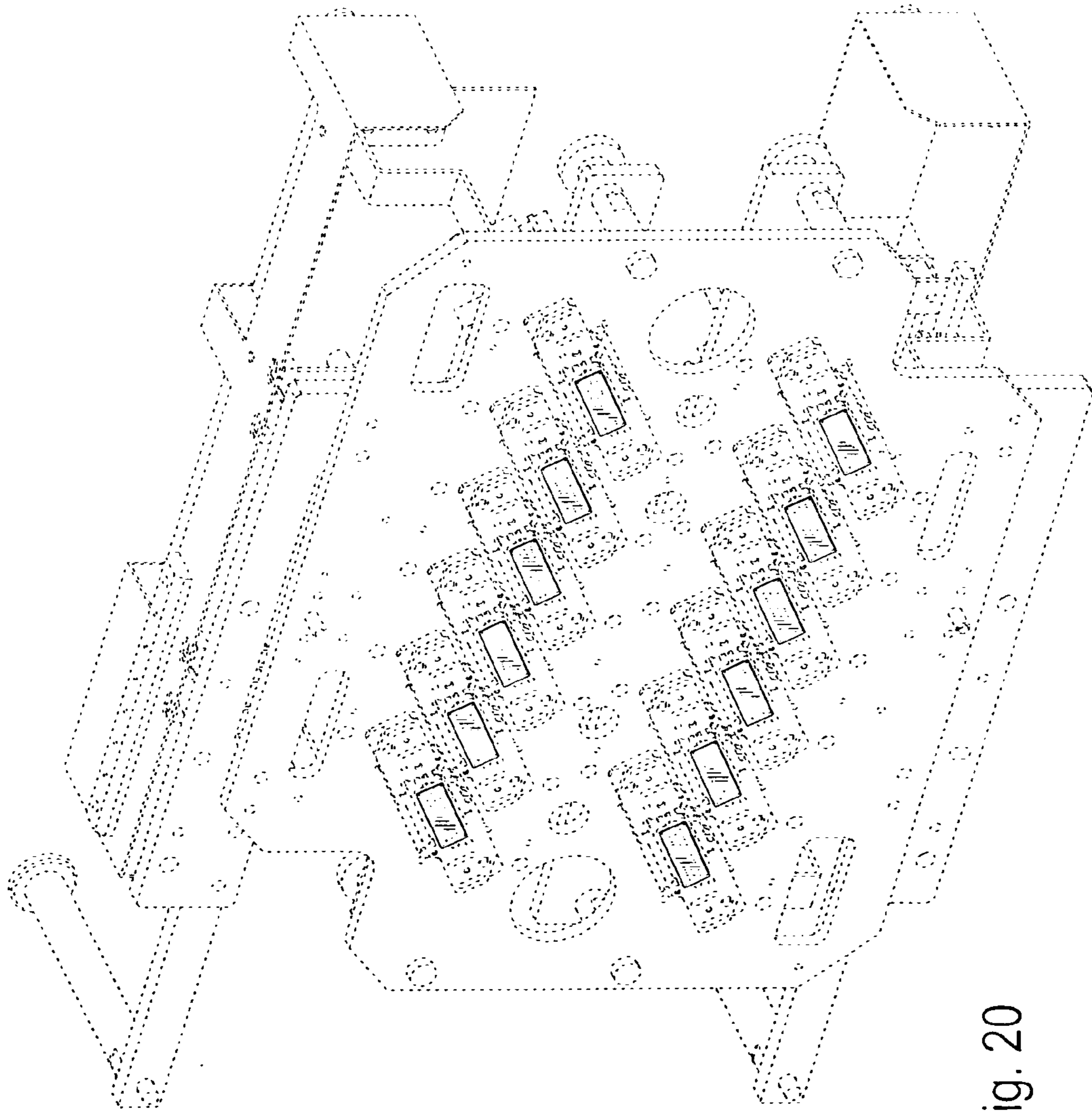


Fig. 20