



US00D359024S

United States Patent [19]

[11] Patent Number: **Des. 359,024**

Ito

[45] Date of Patent: **** Jun. 6, 1995**

[54] DIELECTRIC FILTER

DESCRIPTION

[75] Inventor: **Kenji Ito**, Nagoya, Japan

FIG. 1 is a top plan view of a first embodiment of the piezoelectric filter of the present invention;

[73] Assignee: **NGK Spark Plug Co., Ltd.**, Aichi, Japan

FIG. 2 is a front elevation view of the piezoelectric filter depicted in FIG. 1;

[**] Term: **14 Years**

FIG. 3 is a right side elevation view of the piezoelectric filter depicted in FIG. 1;

[21] Appl. No.: **15,945**

FIG. 4 is a left side elevation view of the piezoelectric filter depicted in FIG. 1;

[22] Filed: **Dec. 2, 1993**

FIG. 5 is a bottom plan view of the piezoelectric filter depicted in FIG. 1;

[30] Foreign Application Priority Data

FIG. 6 is a rear view of the piezoelectric filter depicted in FIG. 1;

Jun. 2, 1993 [JP]	Japan	5-16211
Jun. 2, 1993 [JP]	Japan	5-16212
Jun. 2, 1993 [JP]	Japan	5-16213
Jun. 16, 1993 [JP]	Japan	5-18106
Jun. 16, 1993 [JP]	Japan	5-18107
Jun. 16, 1993 [JP]	Japan	5-18108
Jun. 23, 1993 [JP]	Japan	5-18917
Jun. 23, 1993 [JP]	Japan	5-18918
Jun. 23, 1993 [JP]	Japan	5-18919

FIG. 7 is a cross-sectional view of the piezoelectric filter depicted in FIG. 1 taken along the line 7—7 in FIG. 1;

[52] U.S. Cl. **D13/123; D13/182**

FIG. 8 is a cross-sectional view of the piezoelectric filter depicted in FIG. 2 taken along the line 8—8 in FIG. 2;

[58] Field of Search **D13/123, 182; 333/202, 333/204, 206, 208, 219; 174/52.1, 52.4, 260**

FIG. 9 is a perspective view showing the upper and front side surfaces of the piezoelectric filter depicted in FIG. 1;

[56] References Cited

FIG. 10 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 1;

U.S. PATENT DOCUMENTS

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4,703,291	10/1987	Nishikawa et al.	333/202
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4,795,992	1/1989	Saito et al.	333/202 X
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FIG. 11 is a perspective view showing the upper and front side surfaces of the piezoelectric filter of a second embodiment of the present invention;

FOREIGN PATENT DOCUMENTS

563987	10/1993	European Pat. Off.	333/206
405152803	6/1993	Japan	333/204

FIG. 12 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 11;

Primary Examiner—**Joel Sincavage**

FIG. 13 is a perspective view showing the upper and front side surfaces of the piezoelectric filter of a third embodiment of the present invention;

Attorney, Agent, or Firm—**Larson and Taylor**

FIG. 14 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 13;

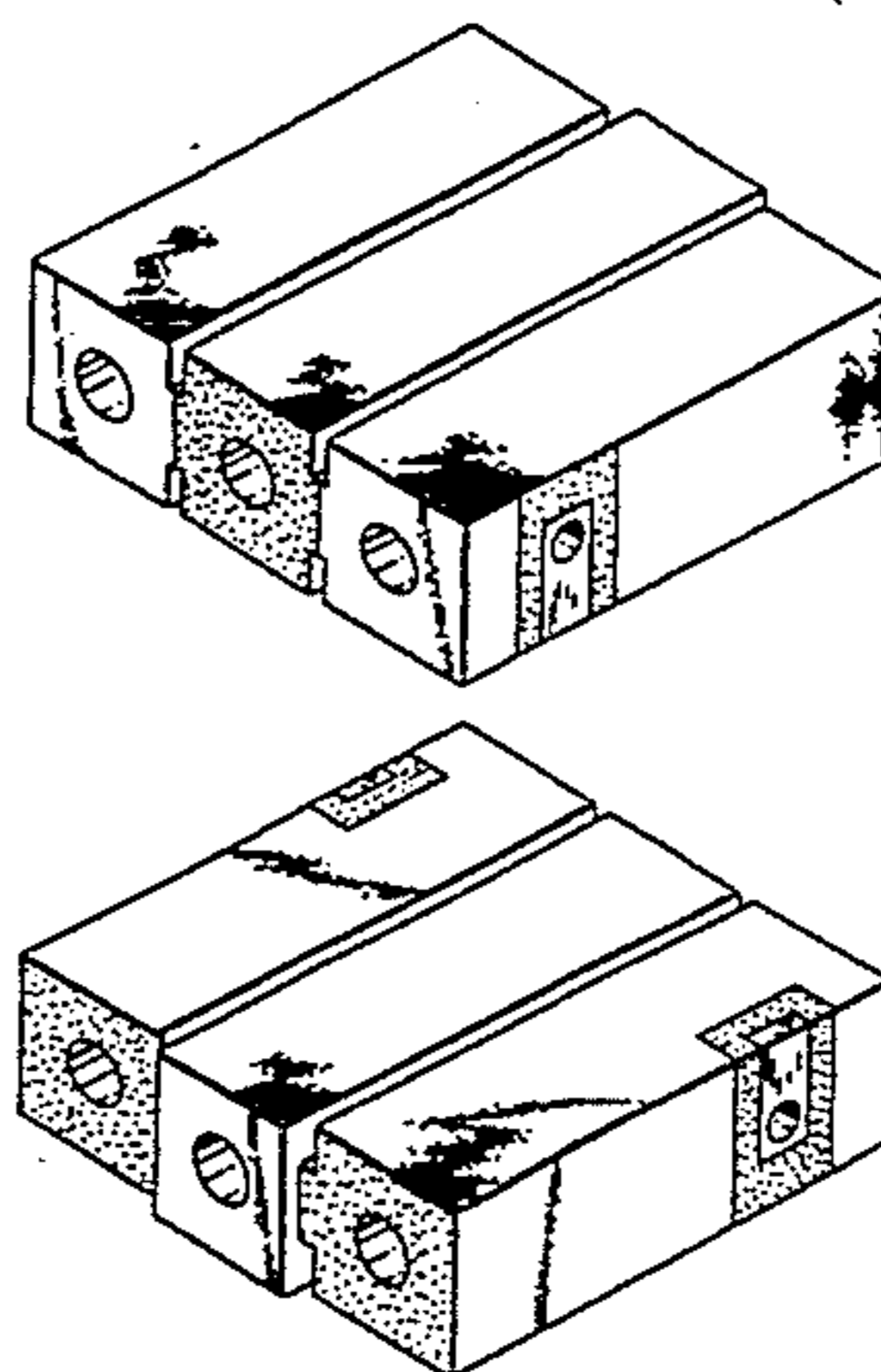
[57] CLAIM

FIG. 15 is a perspective view showing the upper and front side surfaces of the piezoelectric filter of a fourth embodiment of the present invention;

The ornamental design for a piezoelectric filter, as shown and described.

FIG. 16 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 15;

FIG. 17 is a perspective view showing the upper and front side surfaces of the piezoelectric filter of a fifth embodiment of the present invention.
(Description continued on next page.)



DESCRIPTION

front side surfaces of the piezoelectric filter of a fifth embodiment of the present invention;

FIG. 18 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 17;

FIG. 19 is a perspective view showing the upper and front side surfaces of the piezoelectric filter of a sixth embodiment of the present invention;

FIG. 20 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 19;

FIG. 21 is a perspective view showing the upper and front side surfaces of the piezoelectric filter of a seventh embodiment of the present invention;

FIG. 22 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 21;

FIG. 23 is a perspective view showing the upper and front side surfaces of the piezoelectric filter of an eighth embodiment of the present invention;

FIG. 24 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 23;

FIG. 25 is a perspective view showing the upper and front side surfaces of the piezoelectric filter of a ninth embodiment of the present invention;

FIG. 26 is a perspective view showing the lower and rear surfaces of the piezoelectric filter depicted in FIG. 25;

FIG. 27 is a top view of a tenth embodiment of the piezoelectric filter of the present invention;

FIG. 28 is a front elevation view of the piezoelectric filter depicted in FIG. 27;

FIG. 29 is a side elevation view of the piezoelectric filter depicted in FIG. 27;

FIG. 30 is a bottom plan view of the piezoelectric filter depicted in FIG. 27;

FIG. 31 is a rear view of the piezoelectric filter depicted in FIG. 27;

FIG. 32 is a cross-sectional view of the piezoelectric filter depicted in FIG. 27 taken along the line 32—32 in FIG. 27;

FIG. 33 is a perspective view showing the upper and front surfaces of the piezoelectric filter depicted in FIG. 27;

FIG. 34 is a perspective view showing of an eleventh embodiment of the piezoelectric filter of the present invention, the bottom, rear and left side being the same as the tenth embodiment except for the central channel on the bottom surface; and,

FIG. 35 is a perspective view showing of a twelfth embodiment of the piezoelectric filter of the present invention, the bottom, rear and left side being the same as the tenth embodiment.

FIG. 1

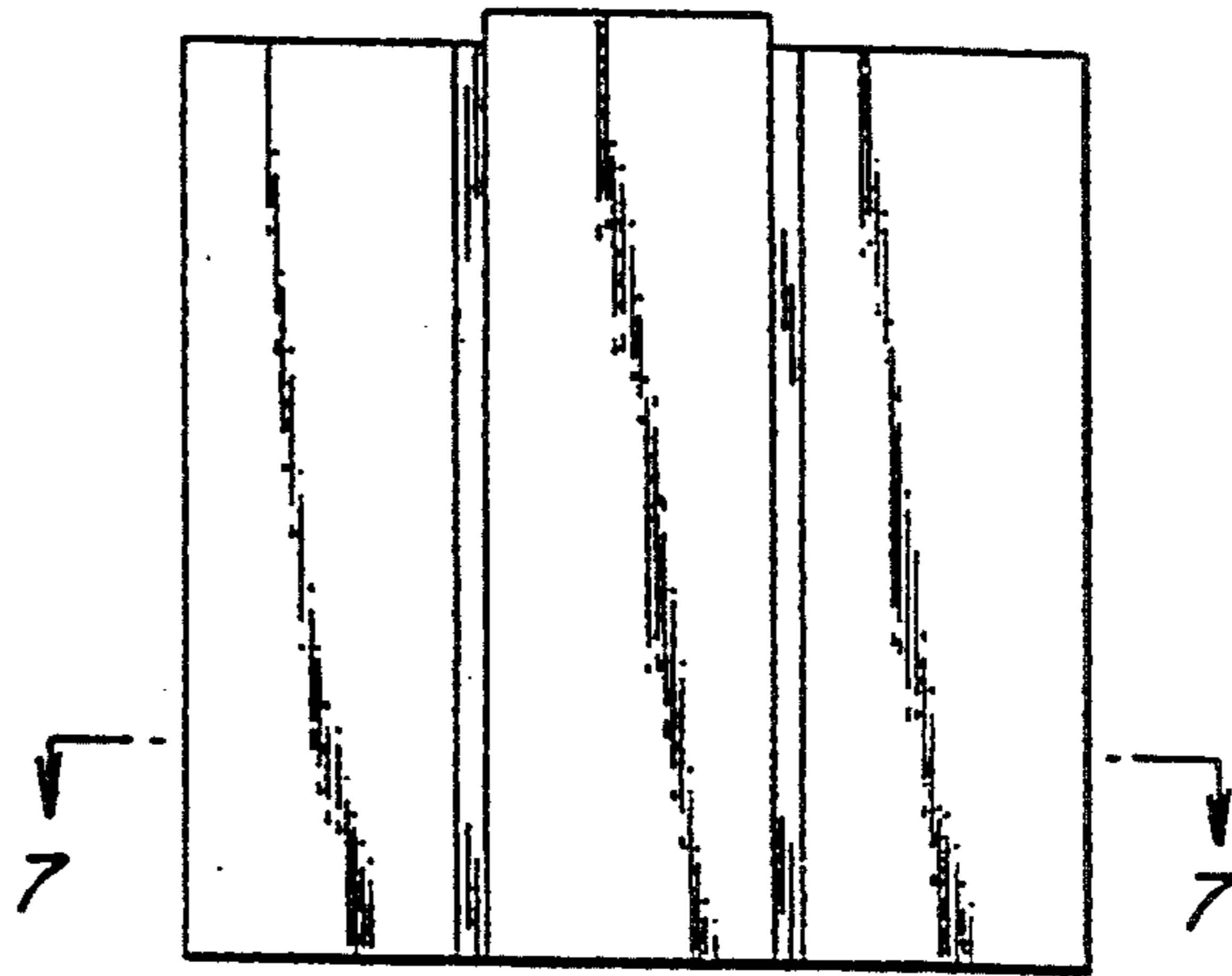


FIG. 2

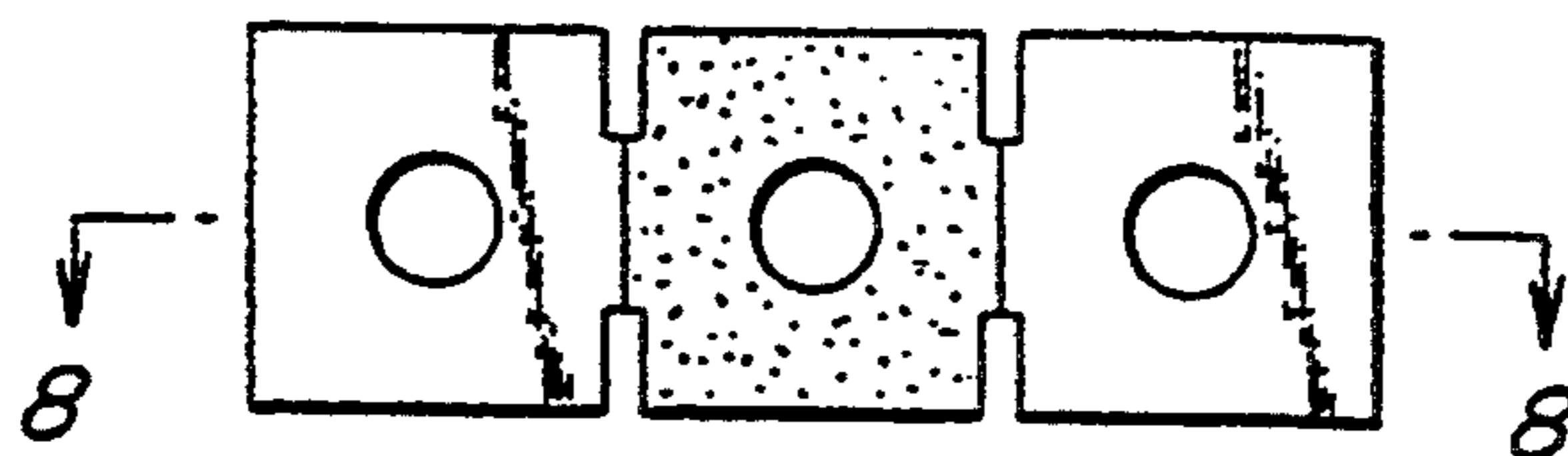


FIG. 3

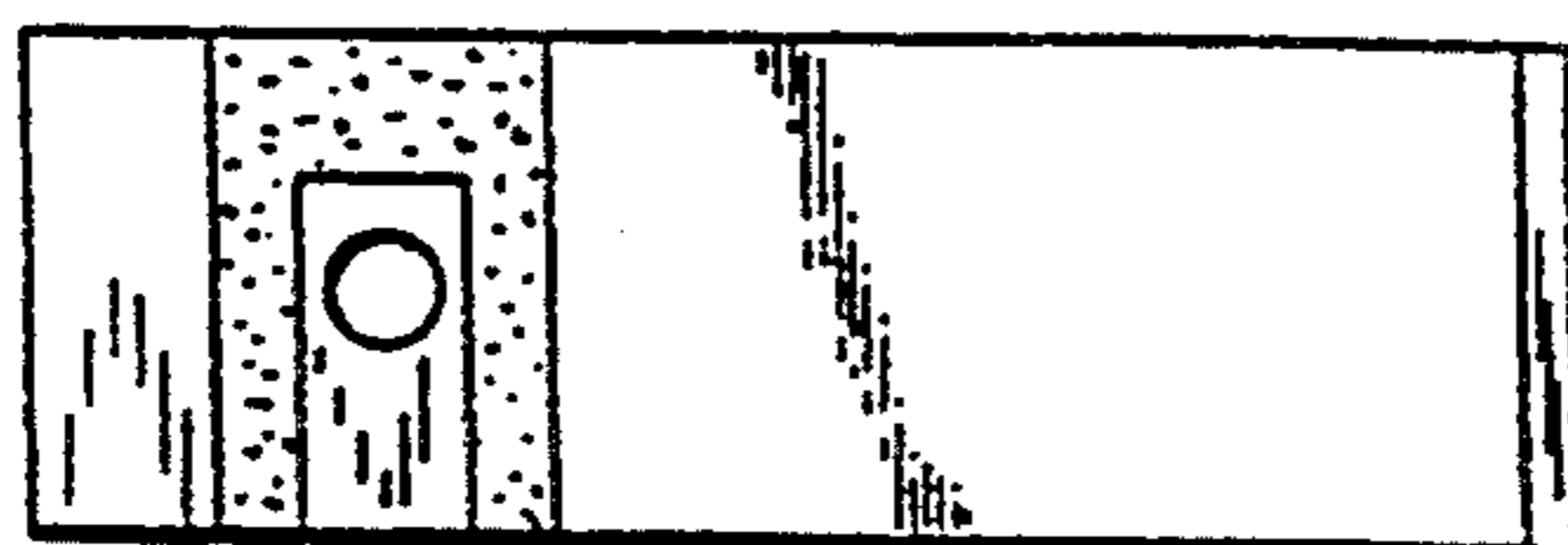


FIG. 4

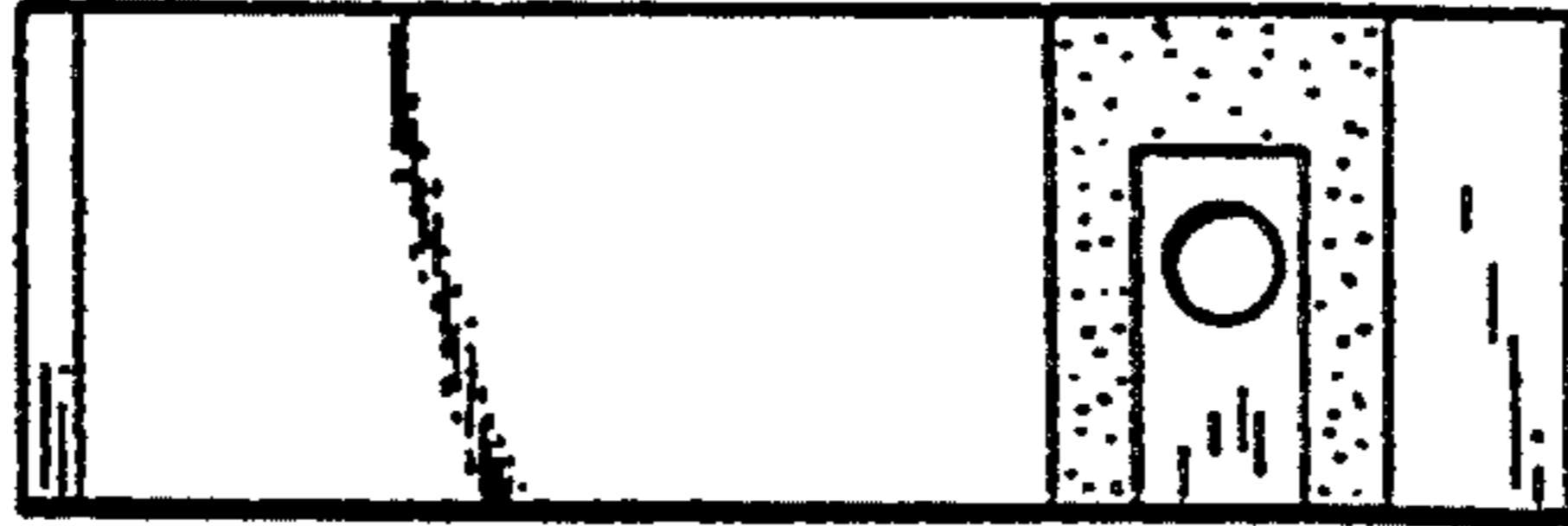


FIG. 5

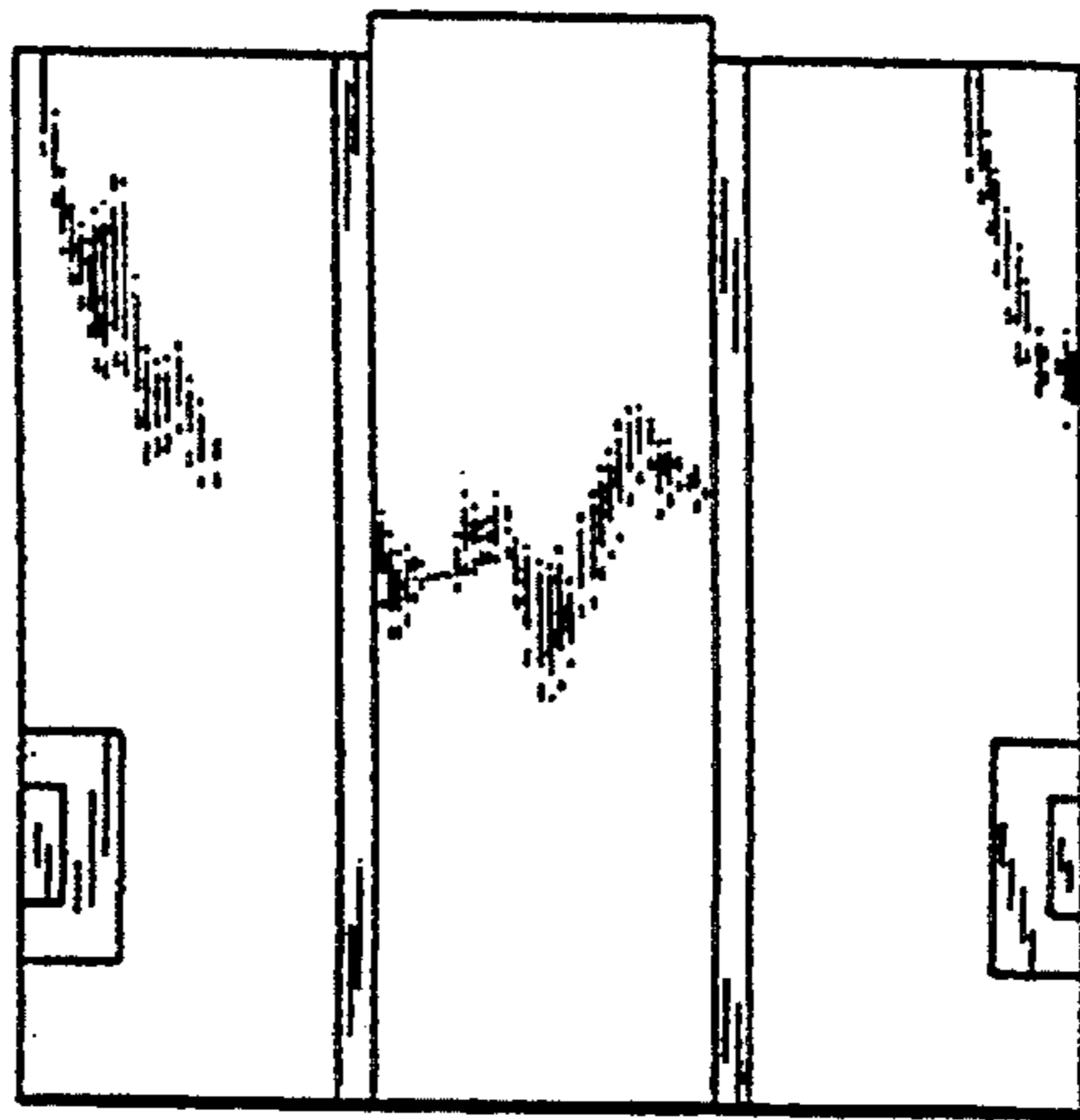


FIG. 6

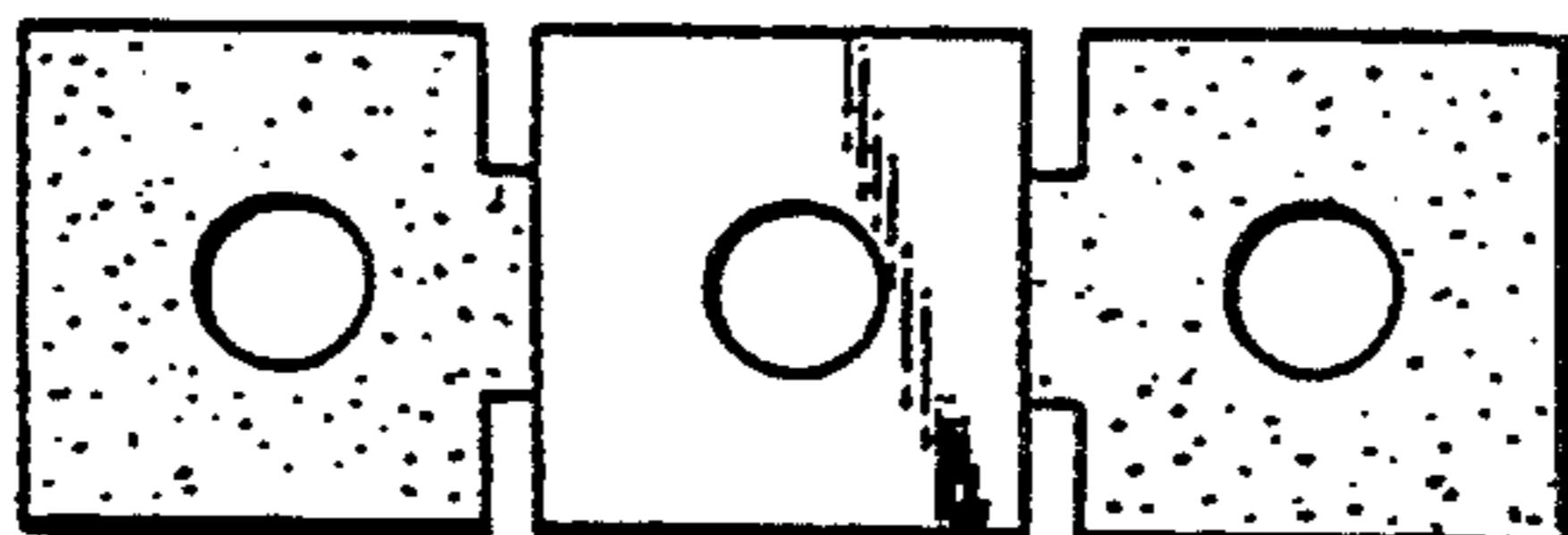


FIG. 7

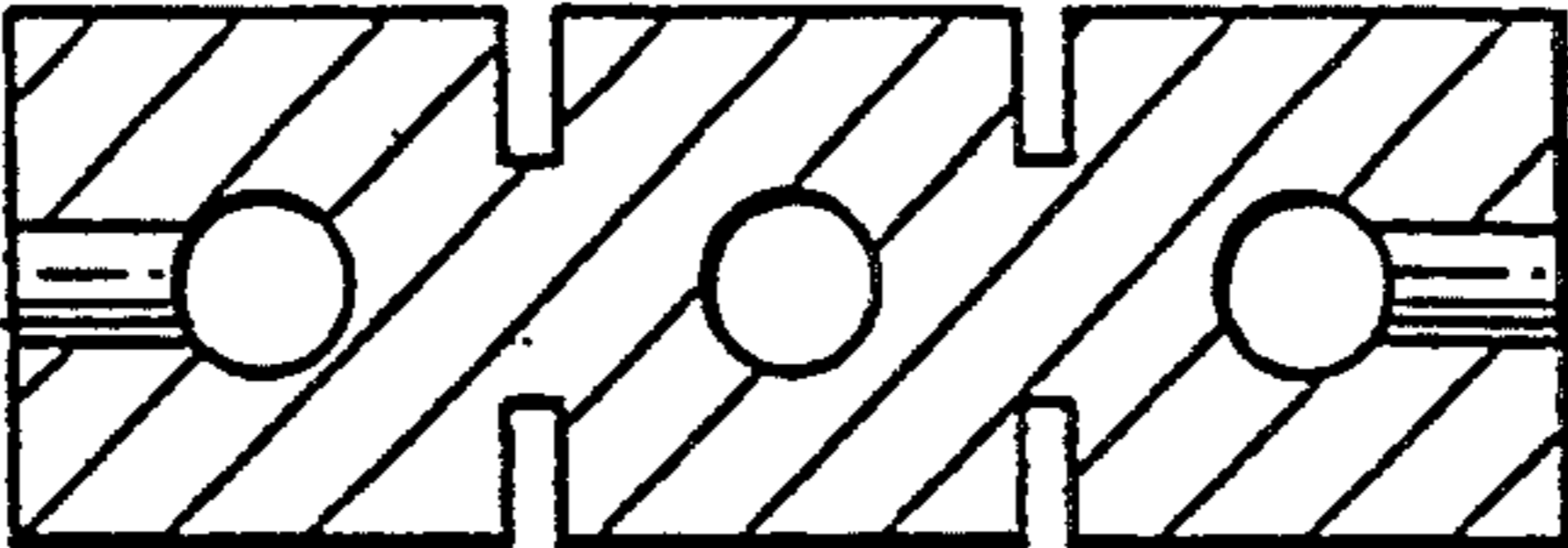


FIG. 8

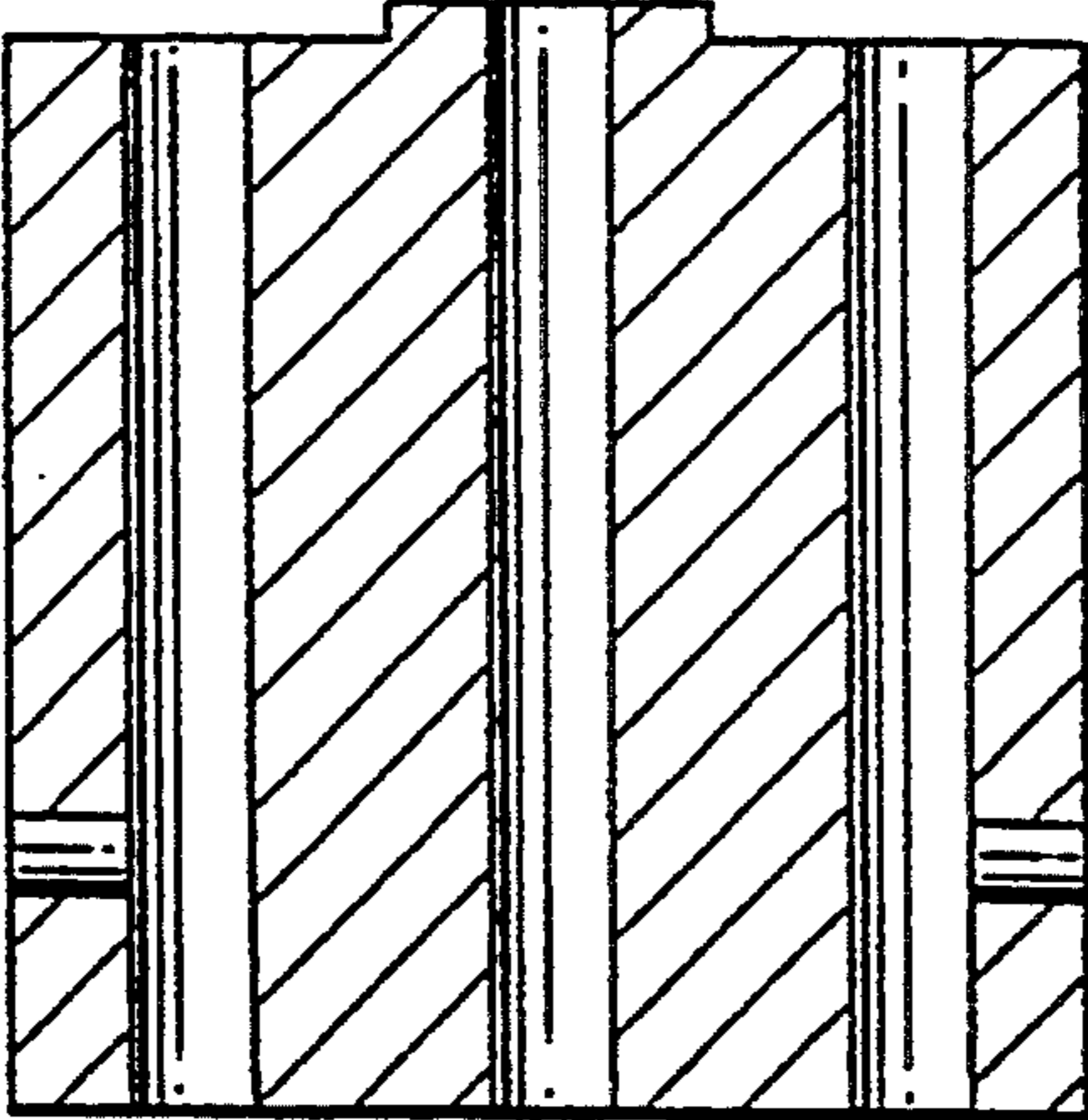


FIG. 9

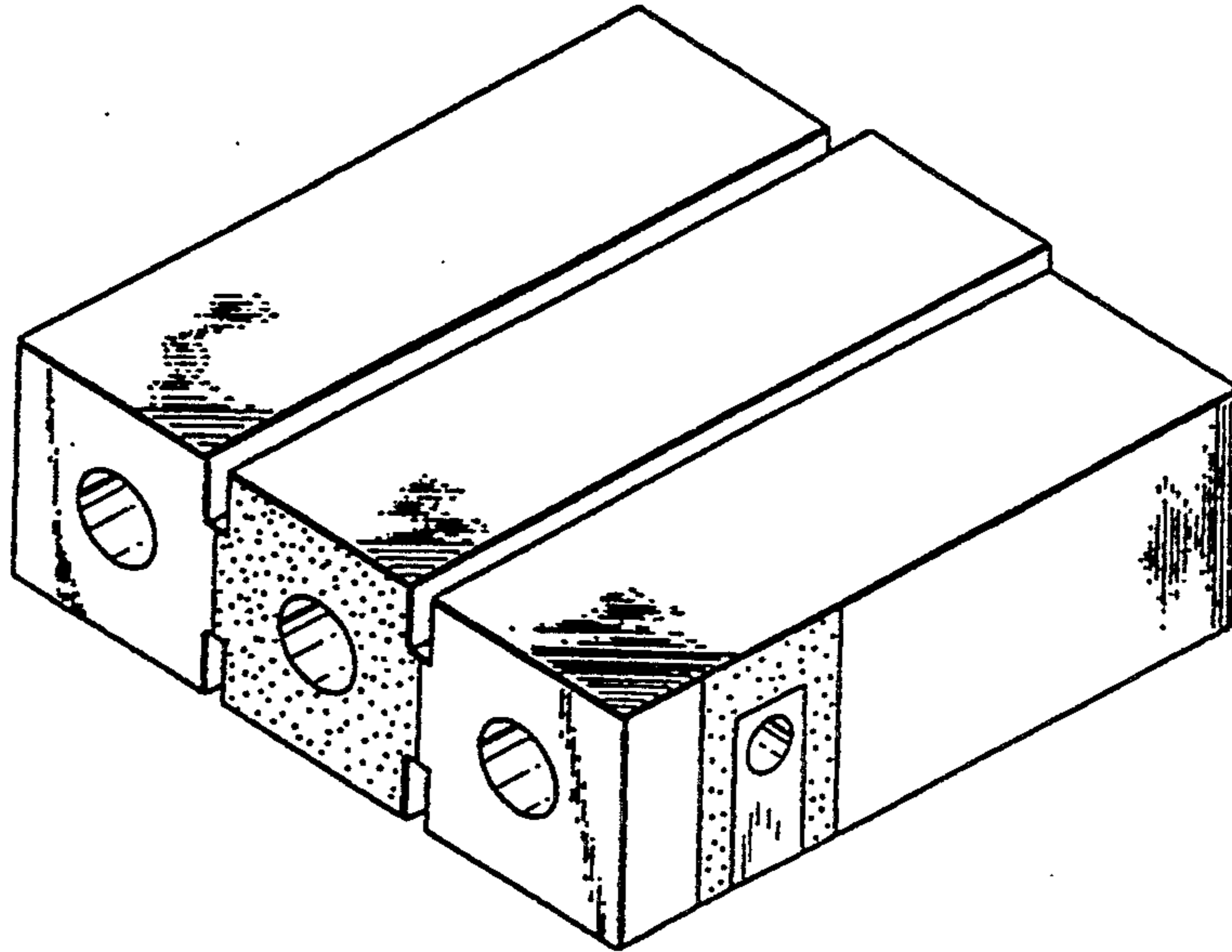


FIG. 10

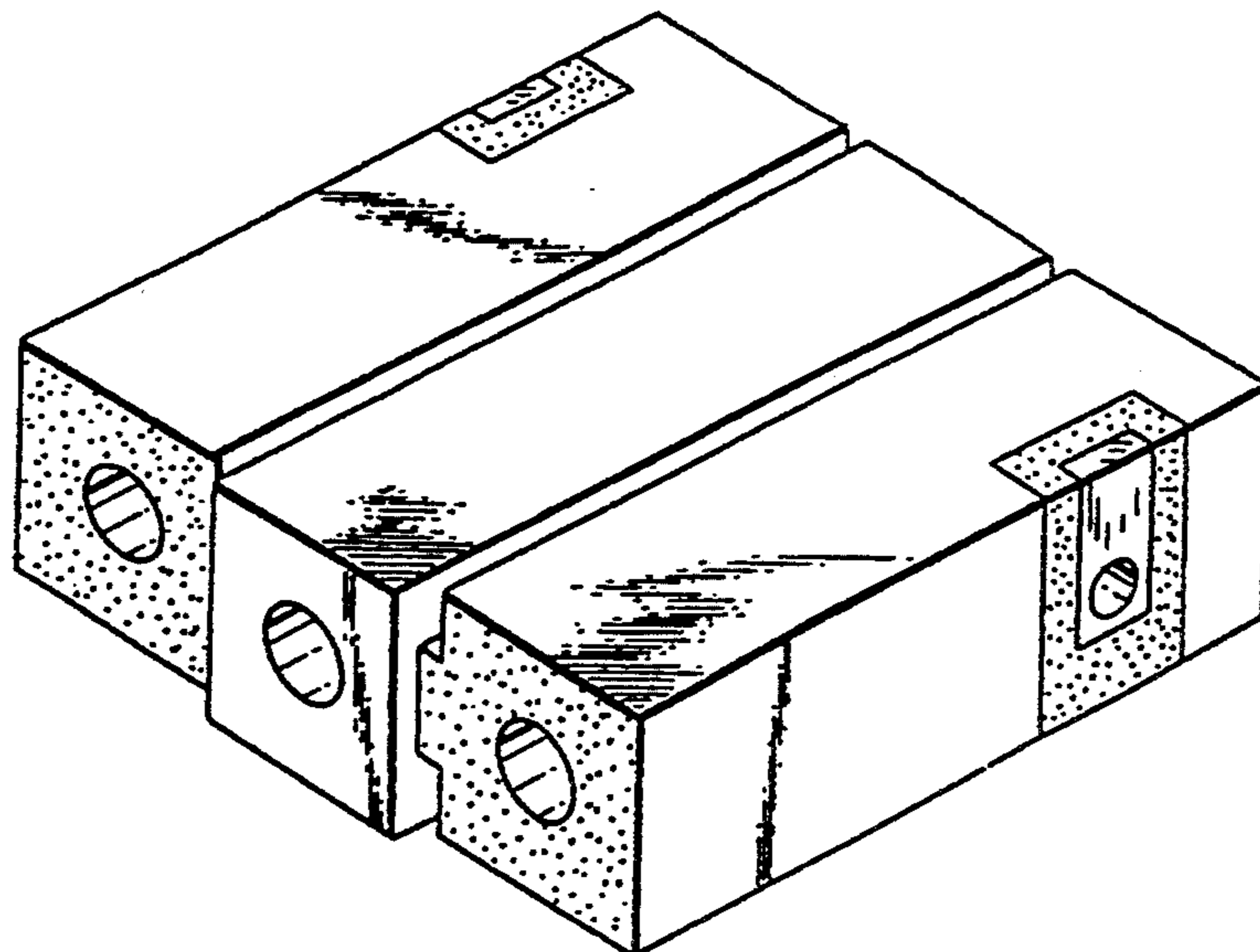


FIG. 11

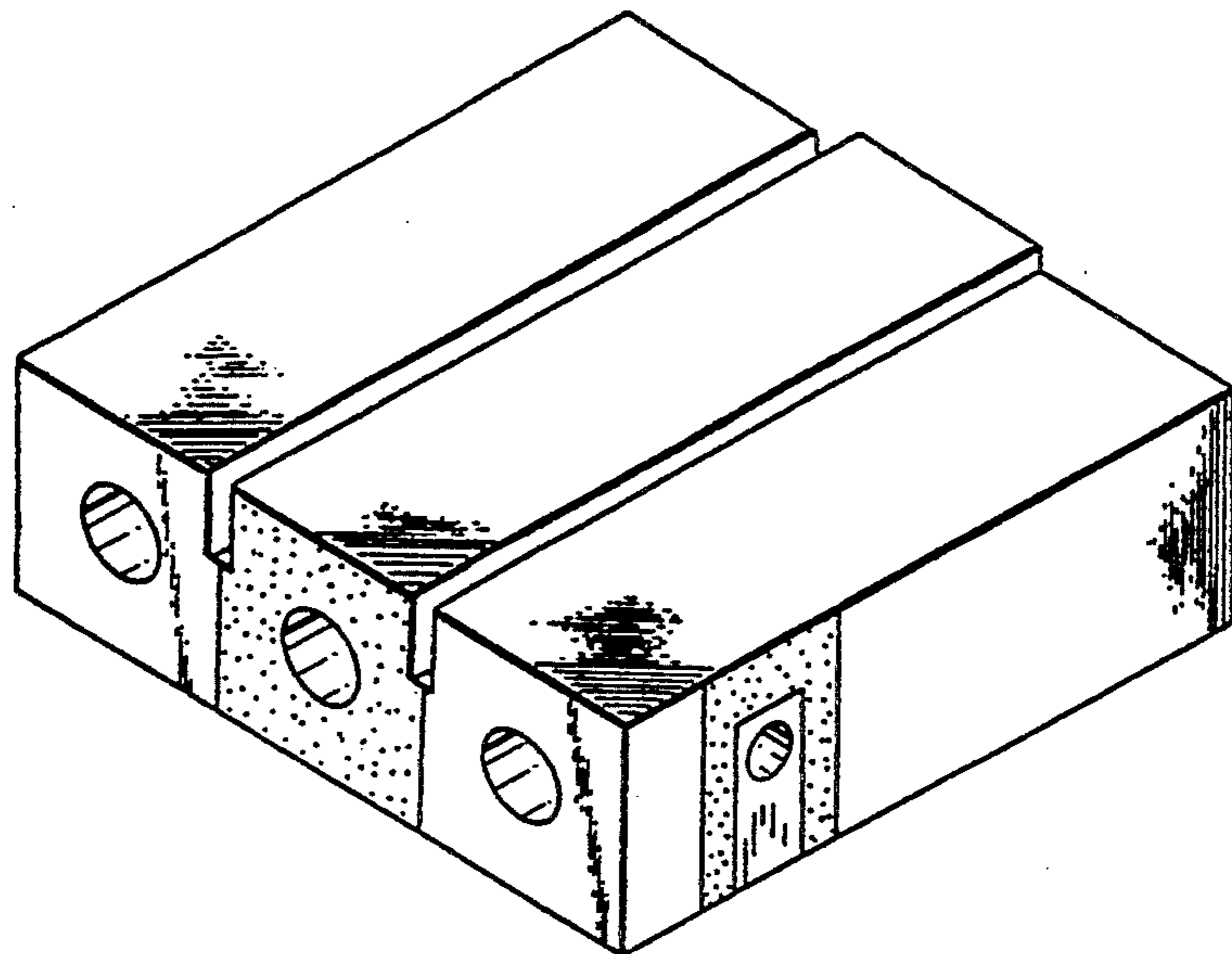


FIG. 12

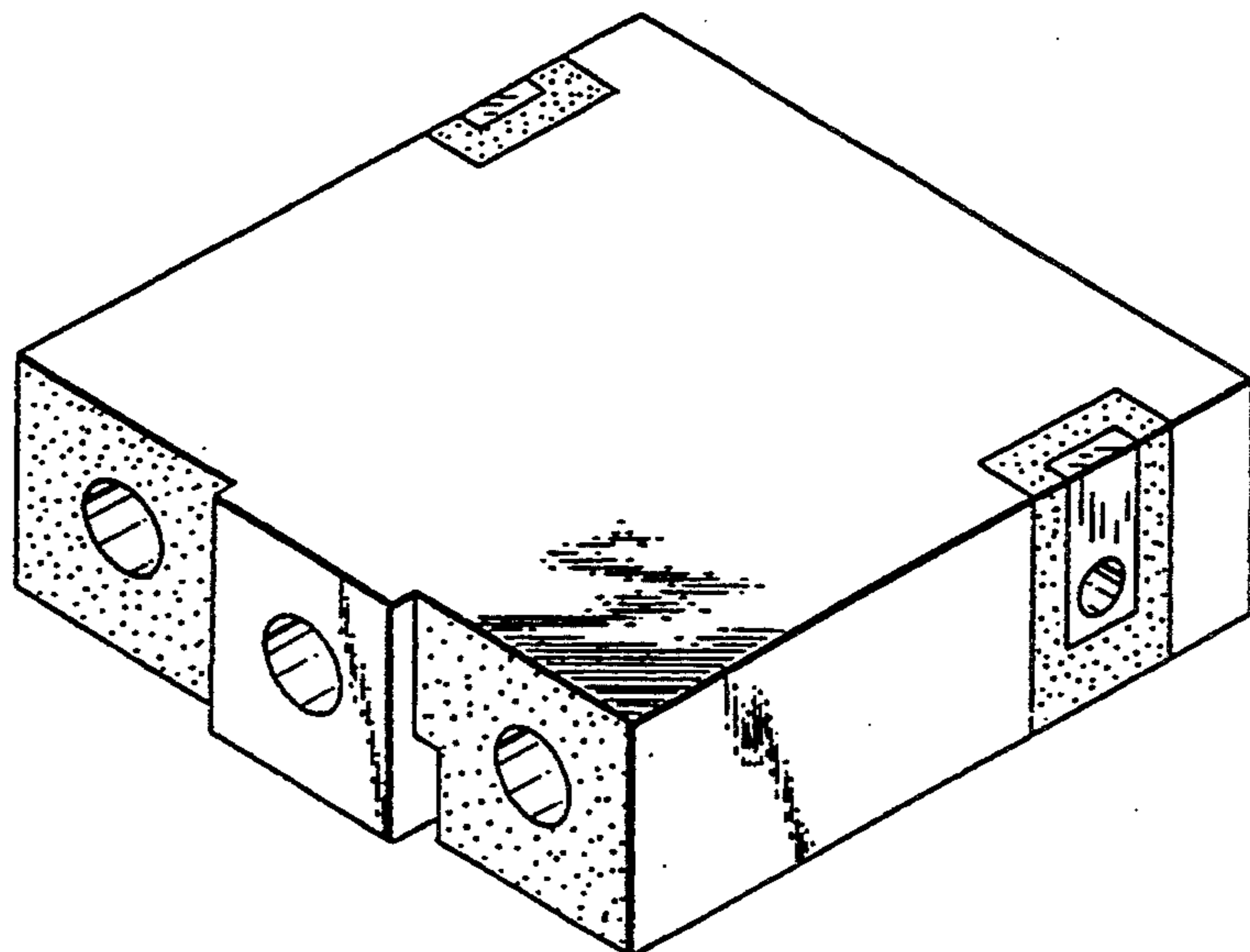


FIG. 13

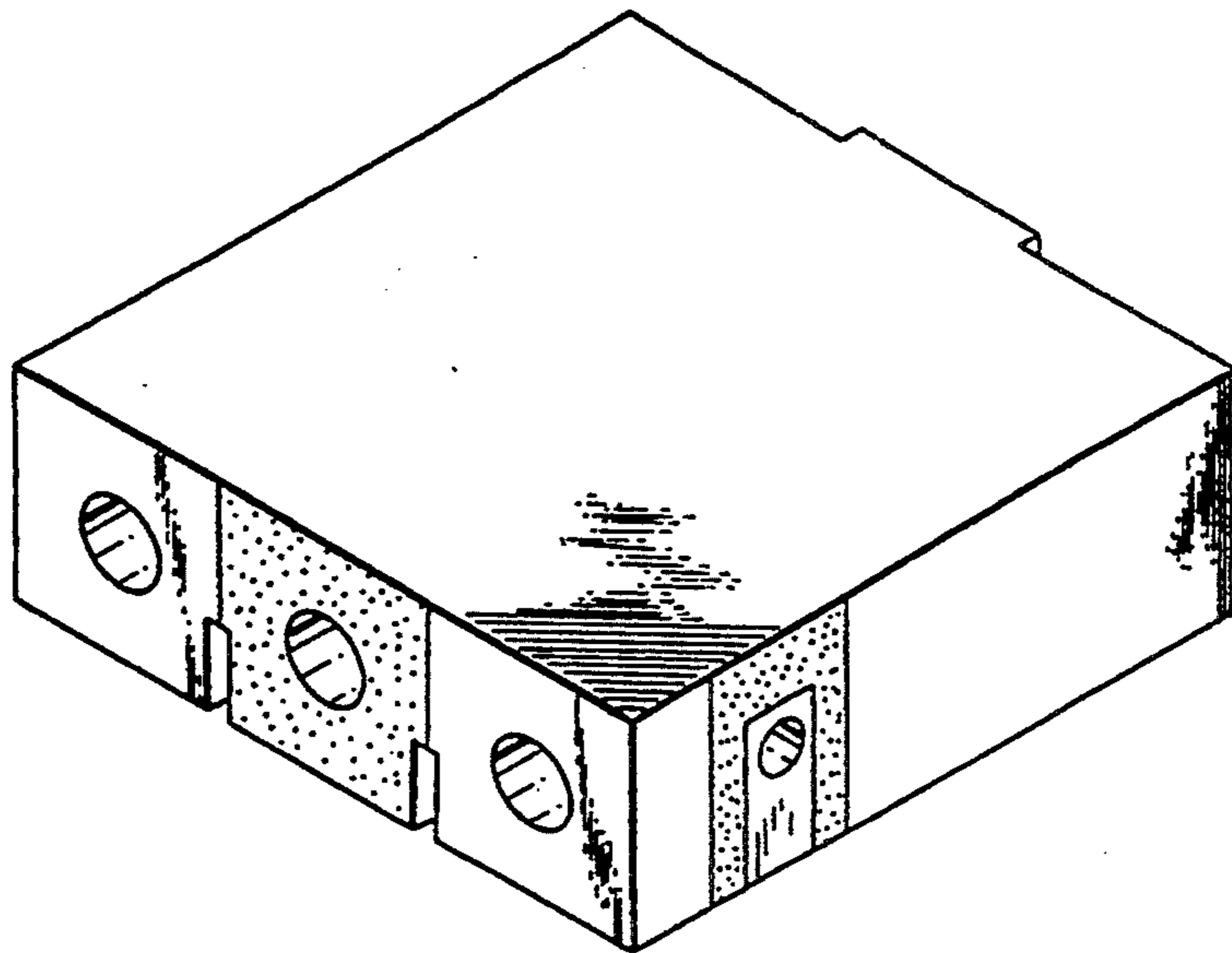


FIG. 14

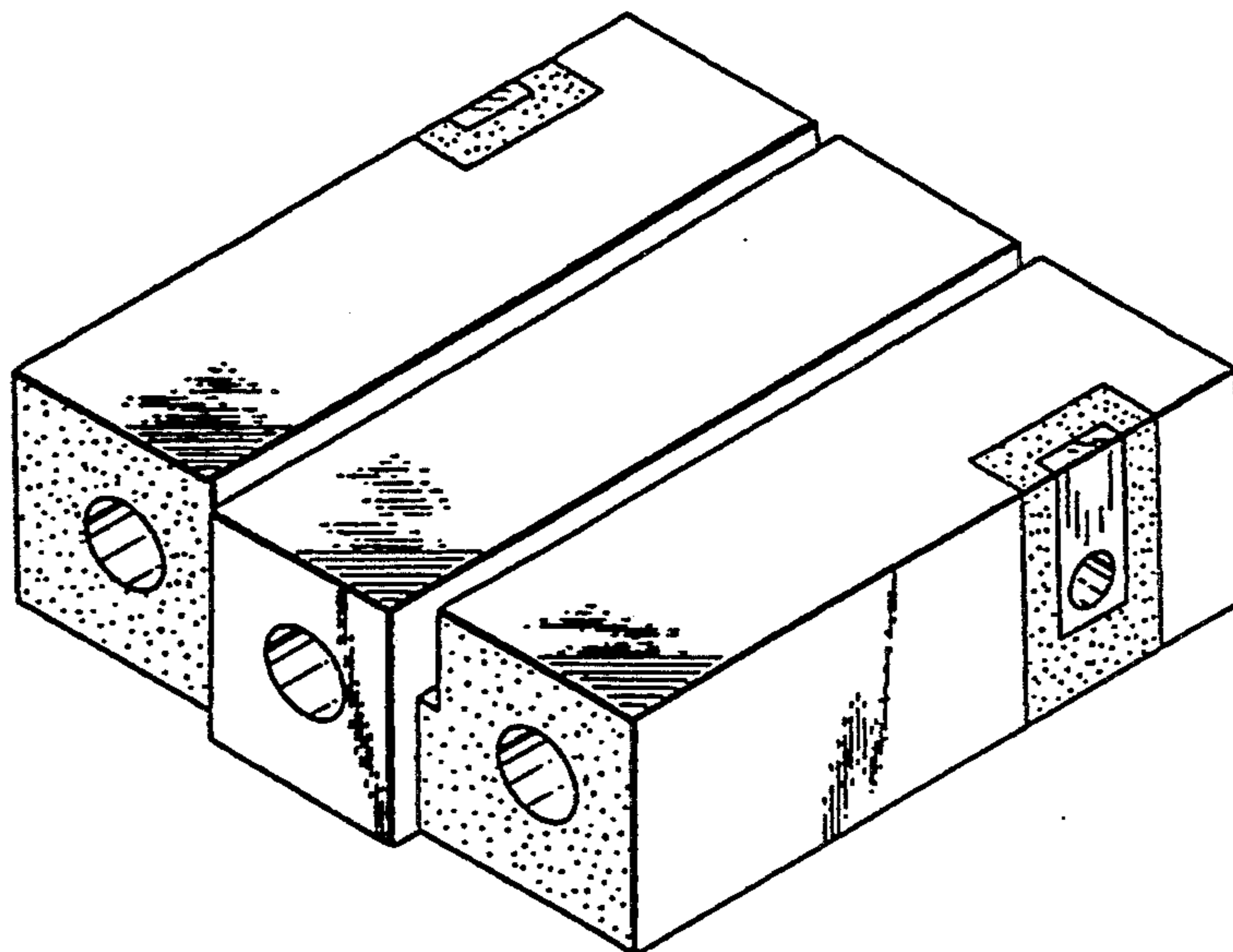


FIG. 15

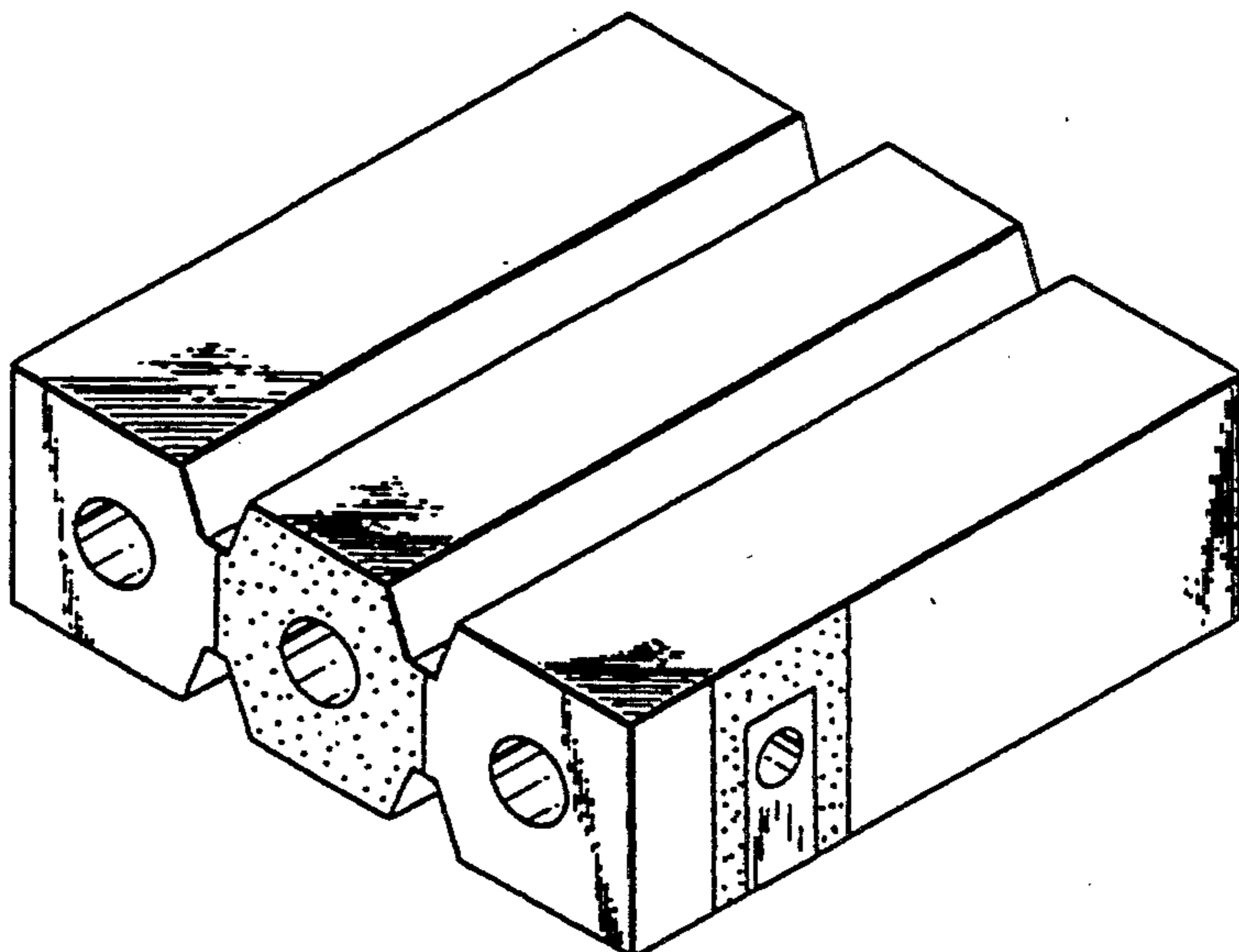


FIG. 16

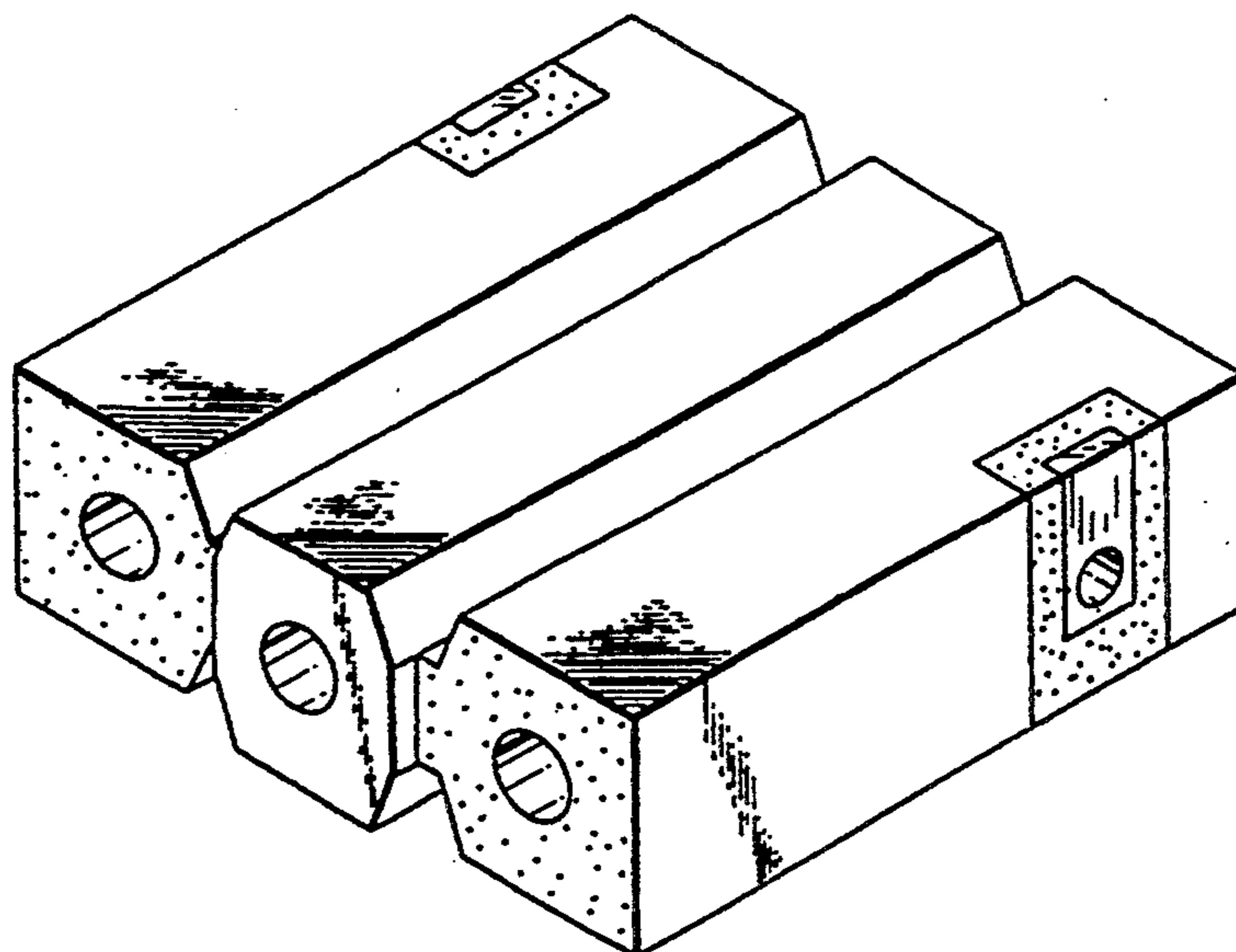


FIG. 17

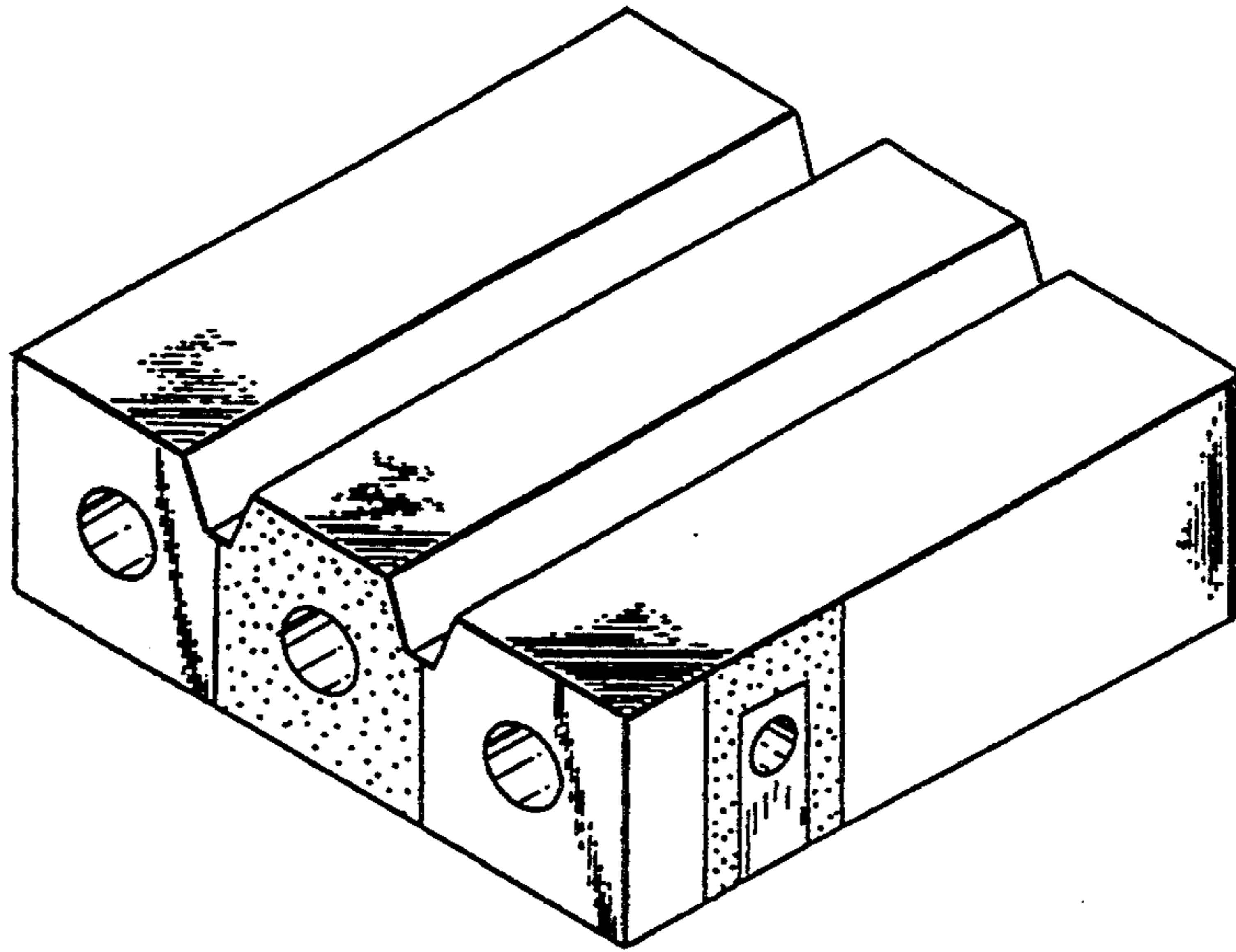


FIG. 18

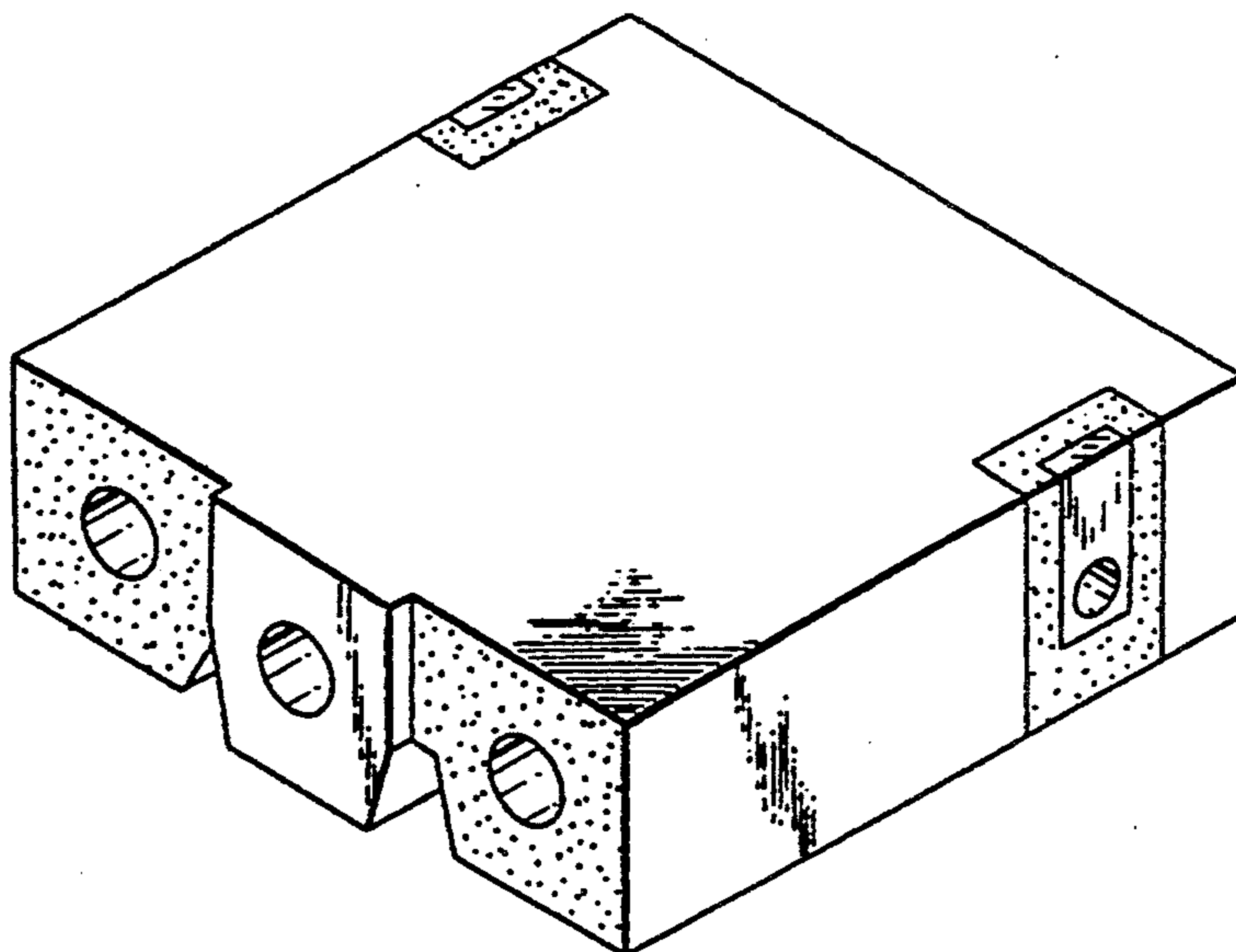


FIG. 19

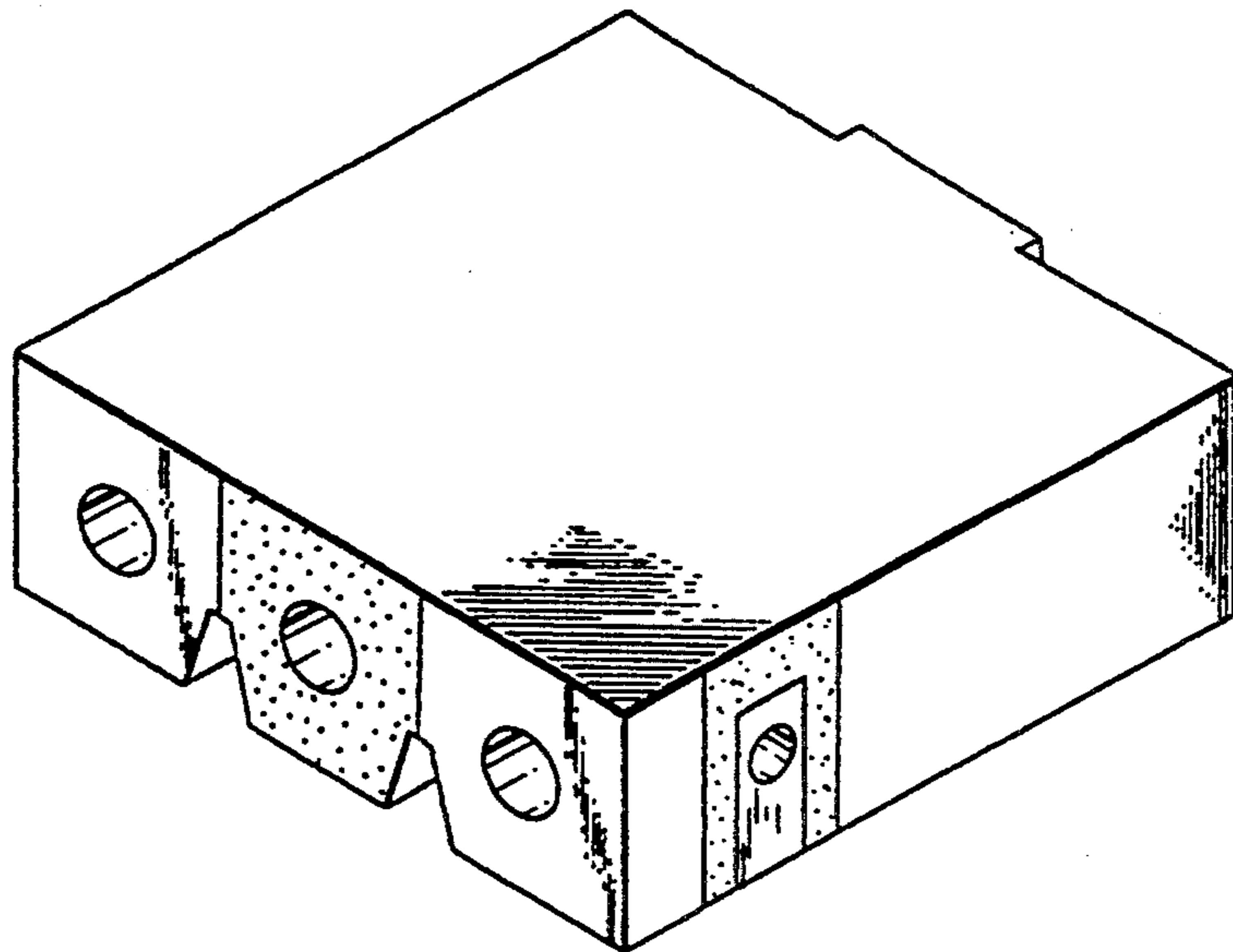


FIG. 20

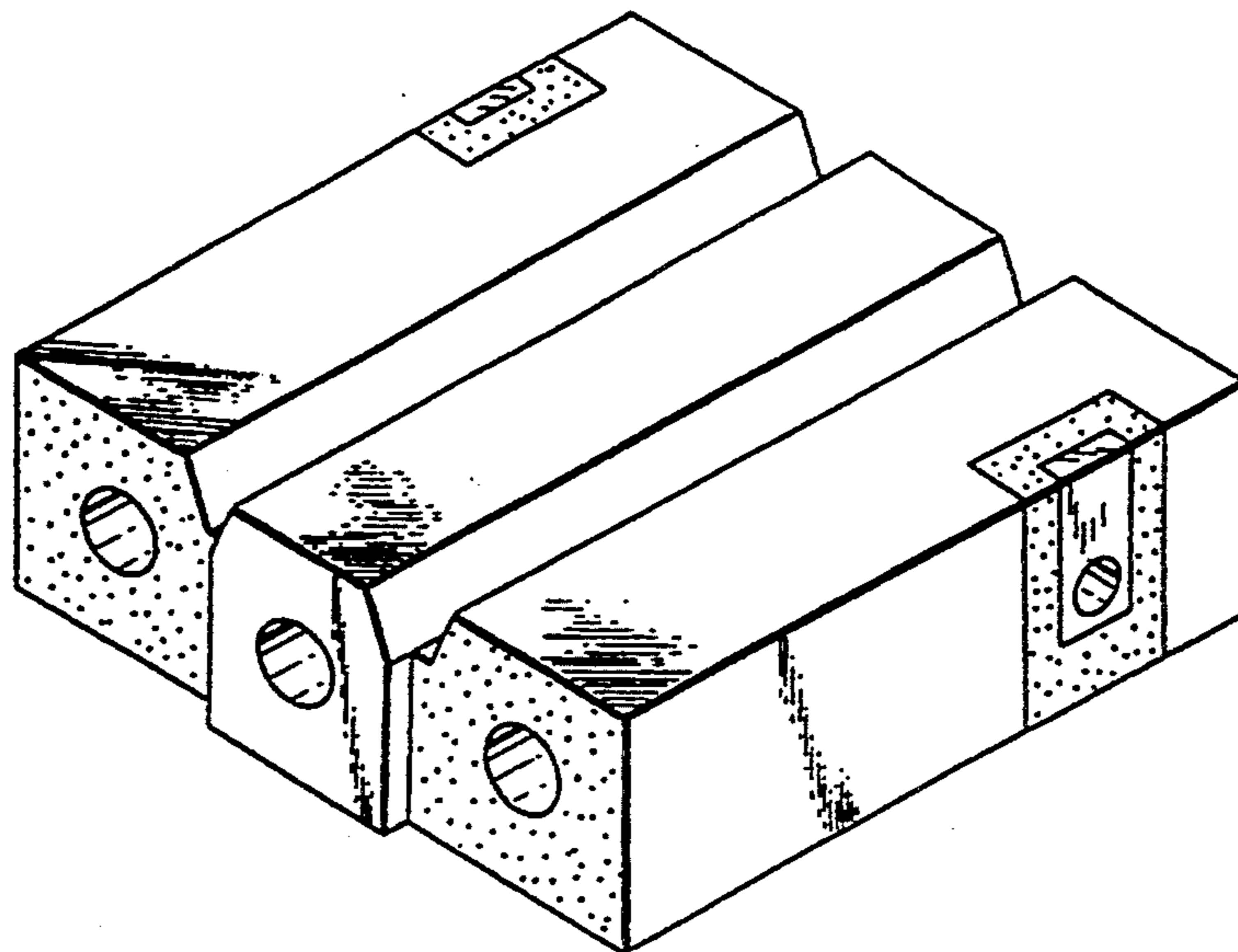


FIG. 21

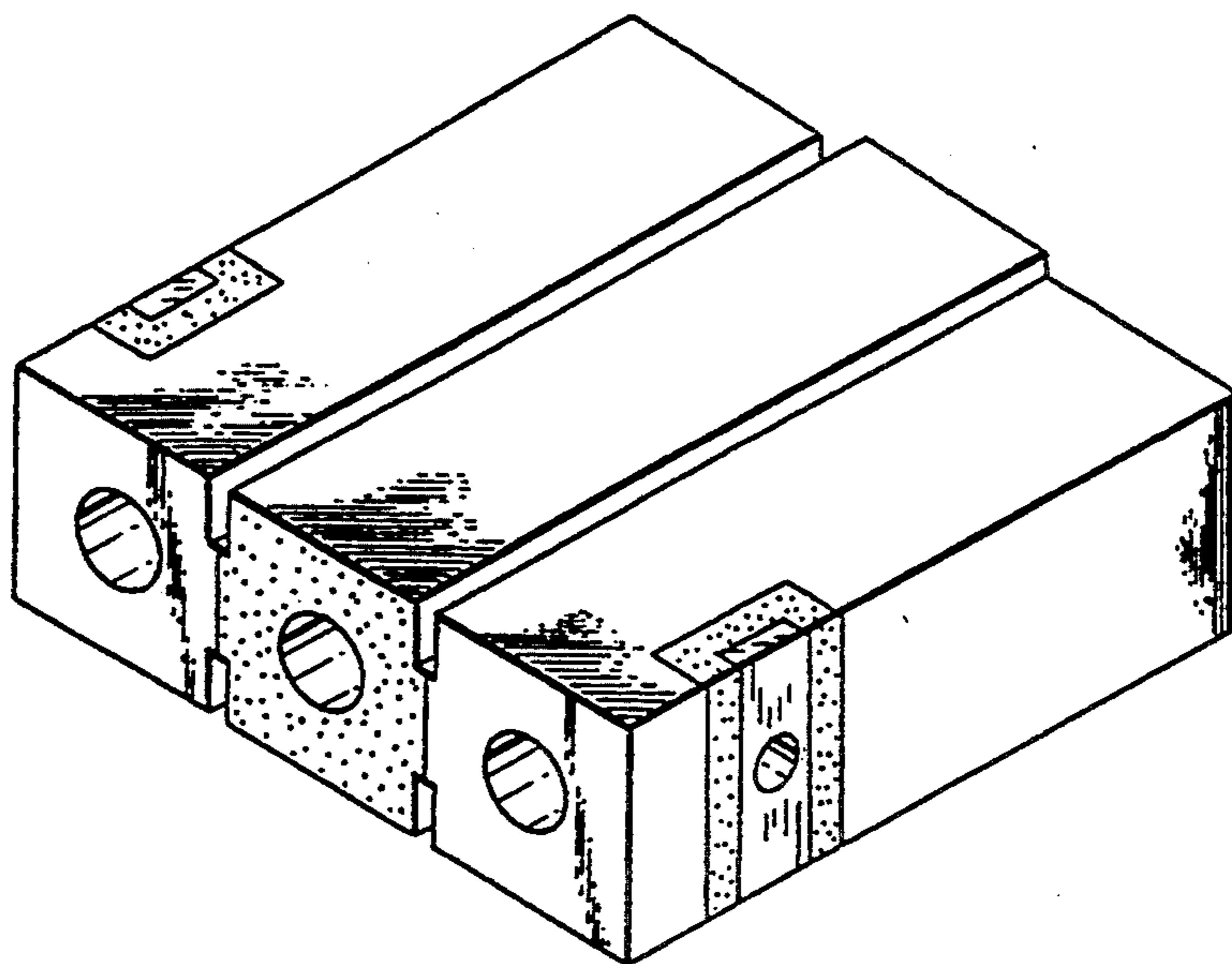


FIG. 22

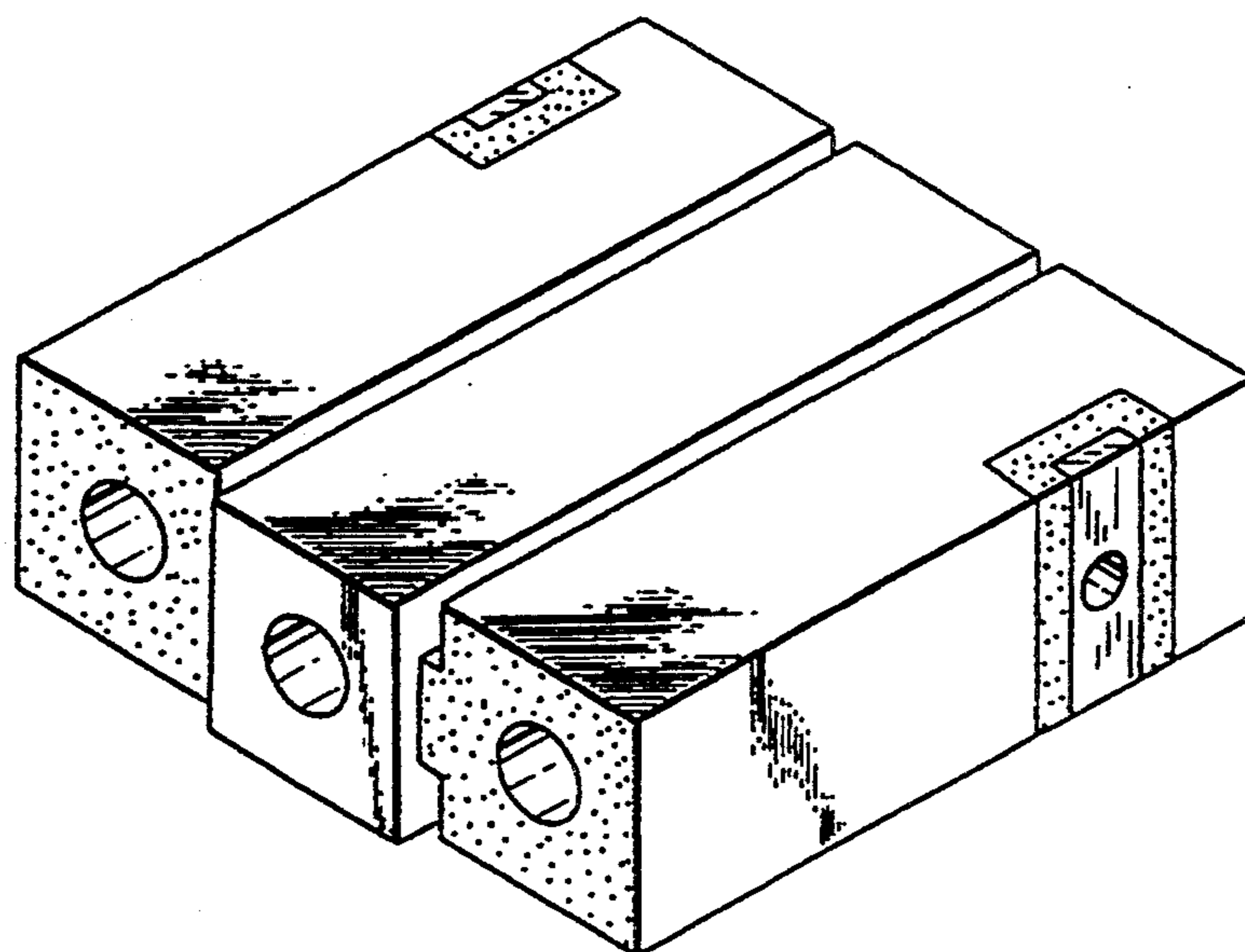


FIG. 23

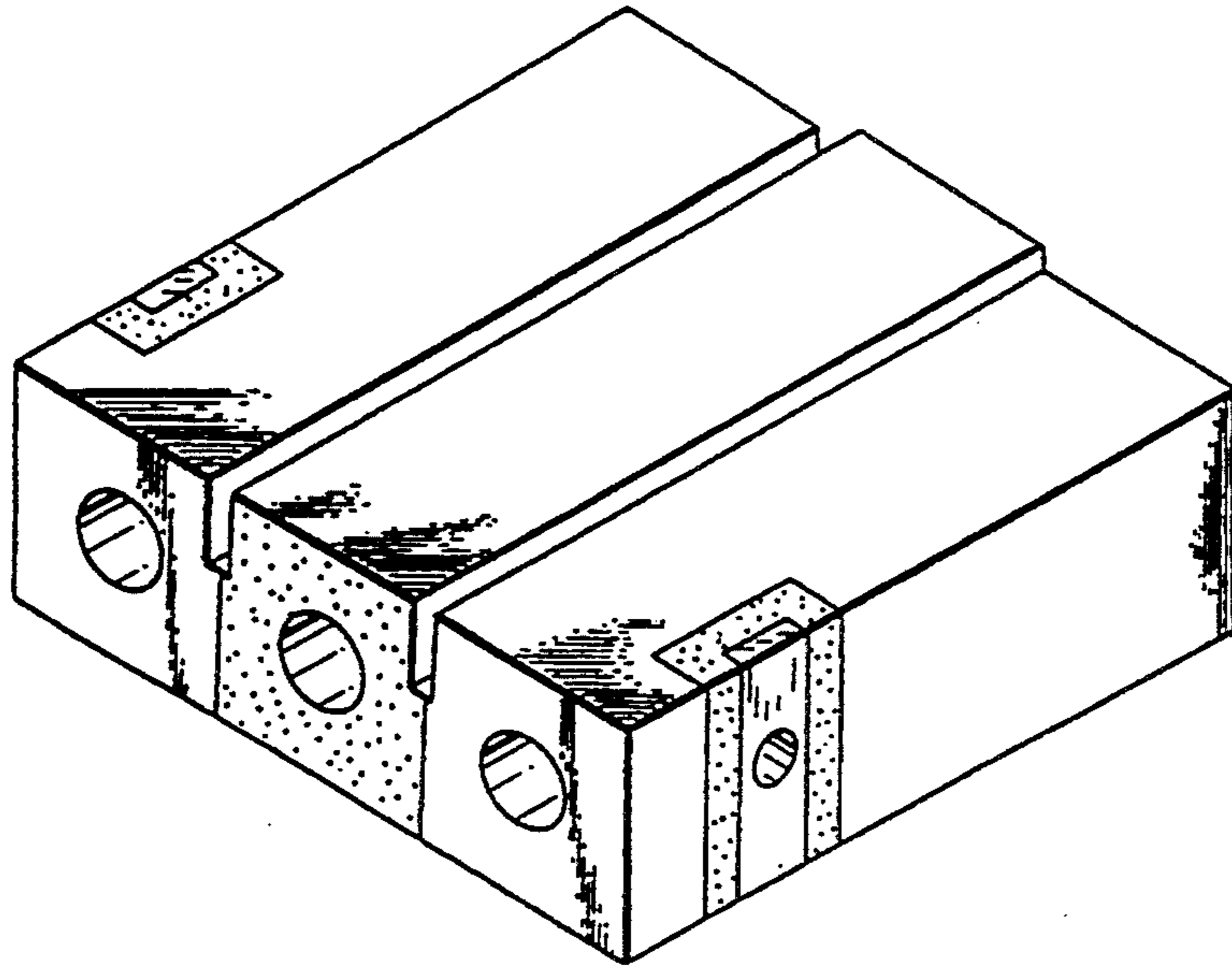


FIG. 24

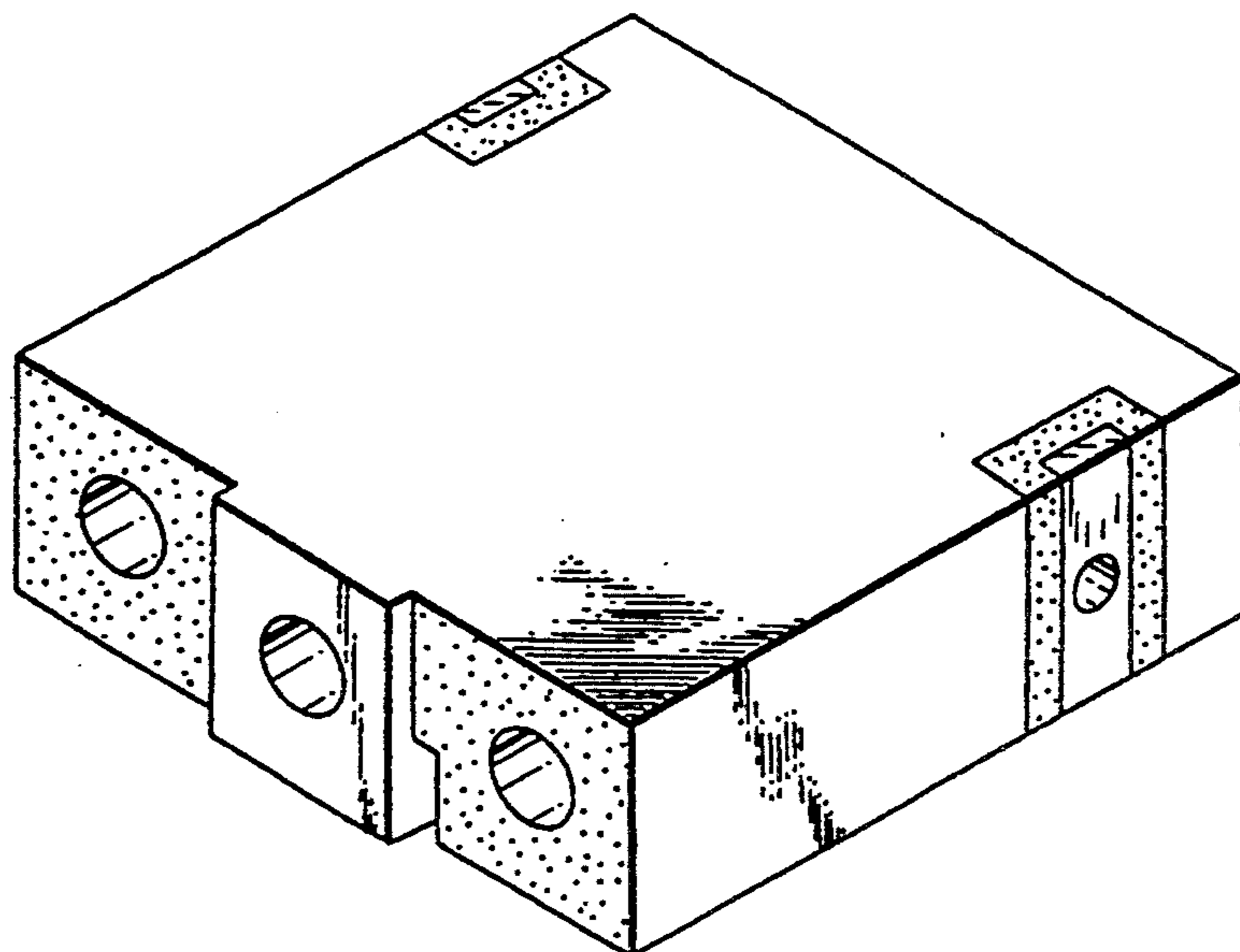


FIG. 25

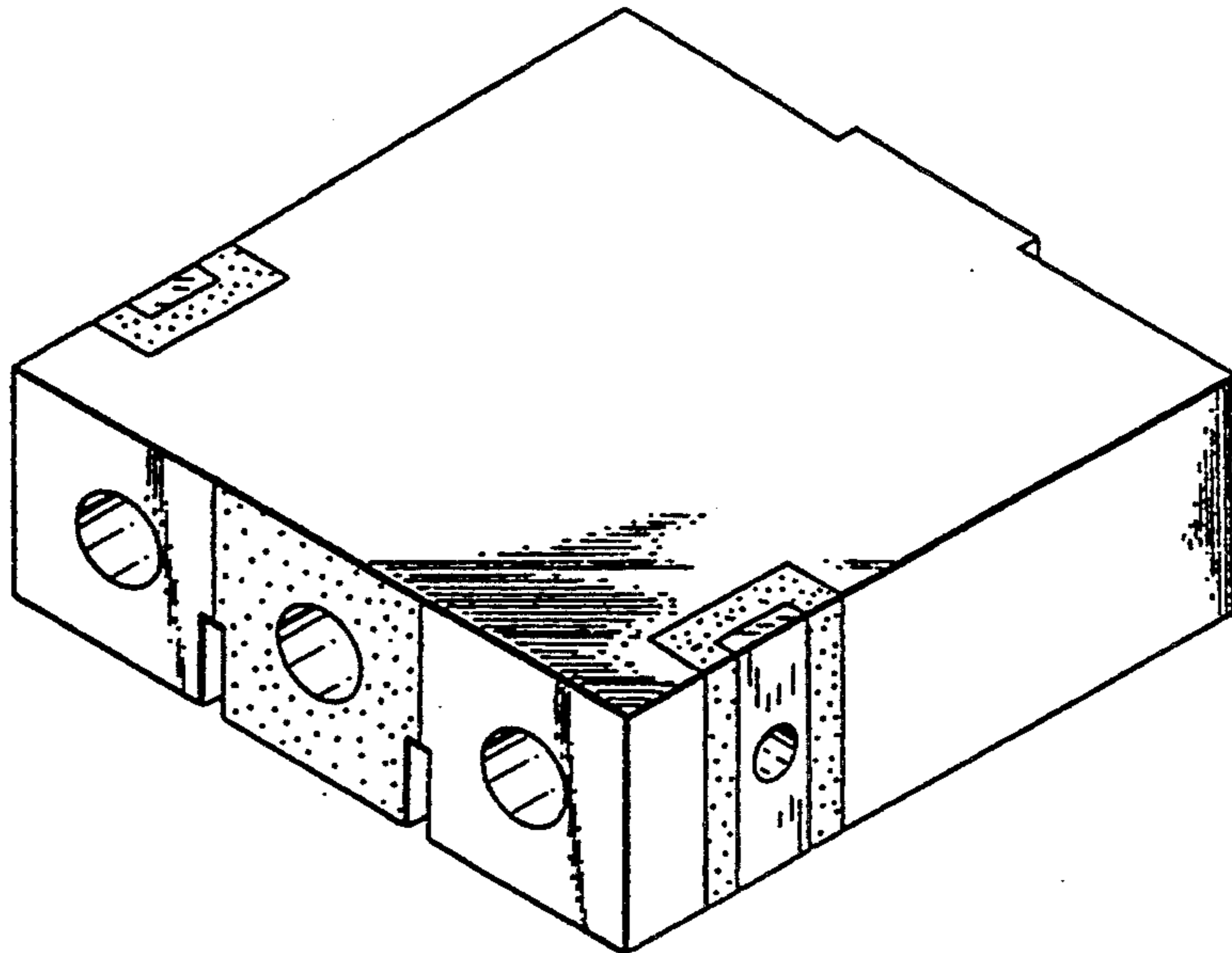


FIG. 26

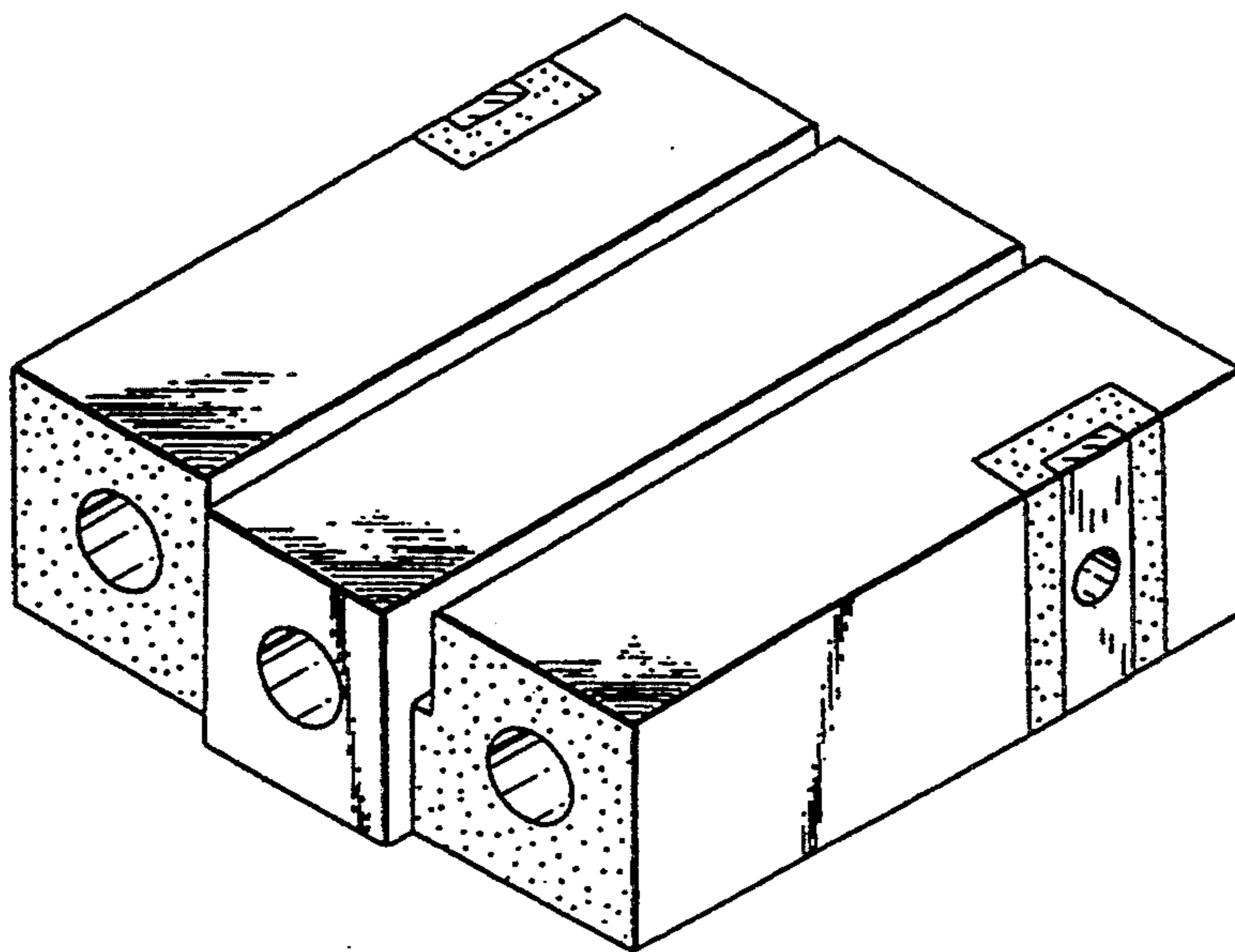


FIG.27

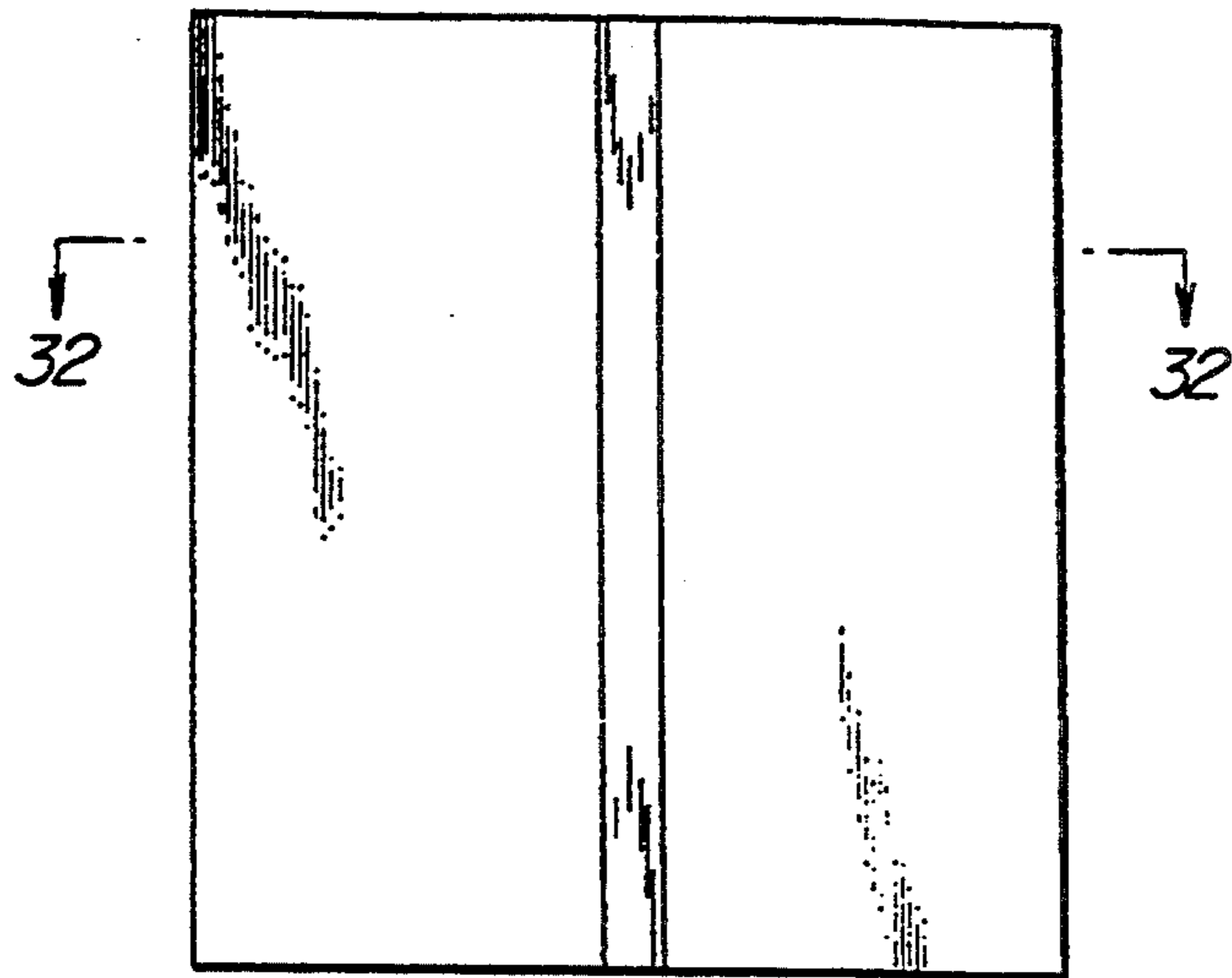


FIG.28

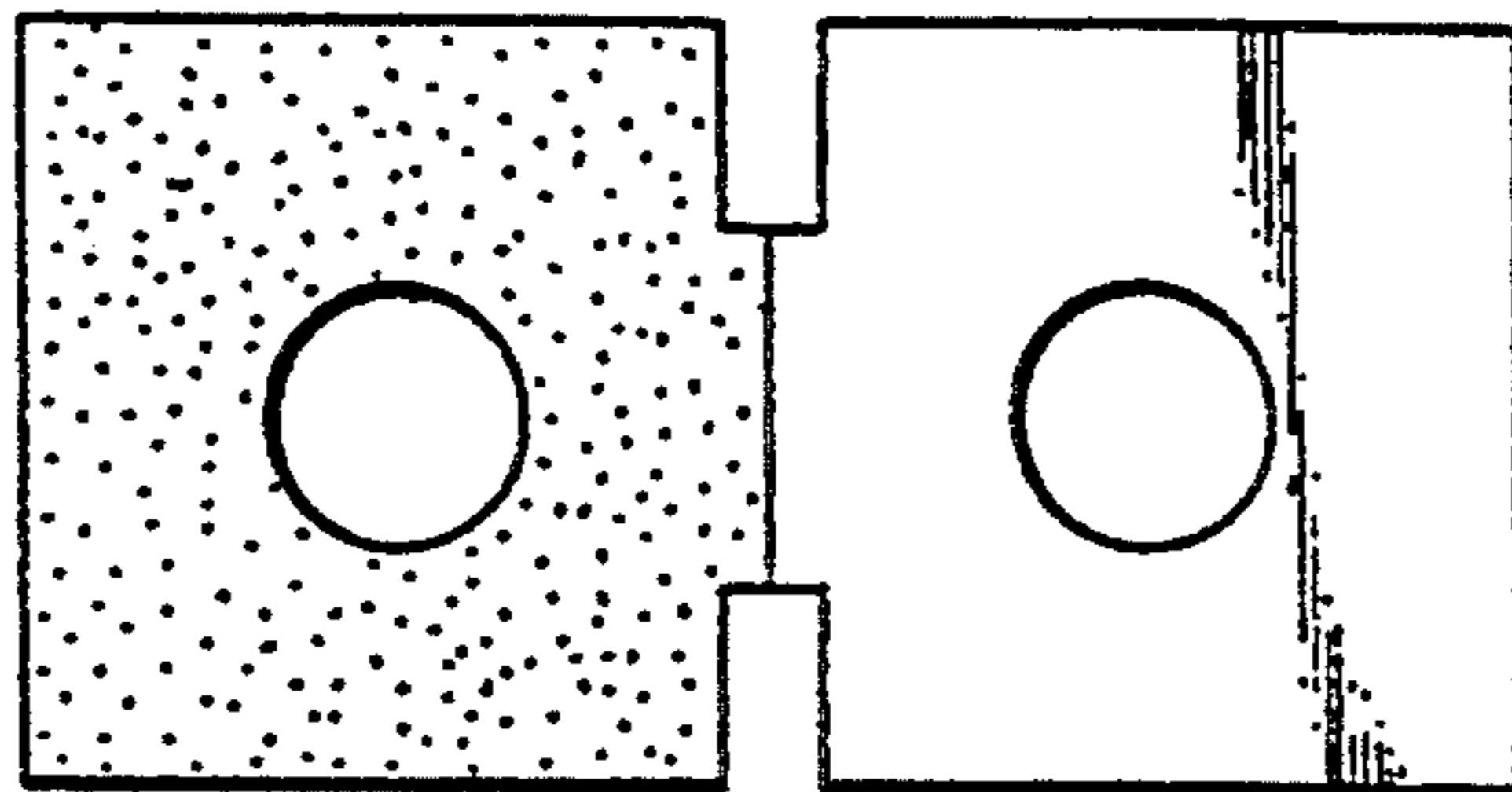


FIG.29

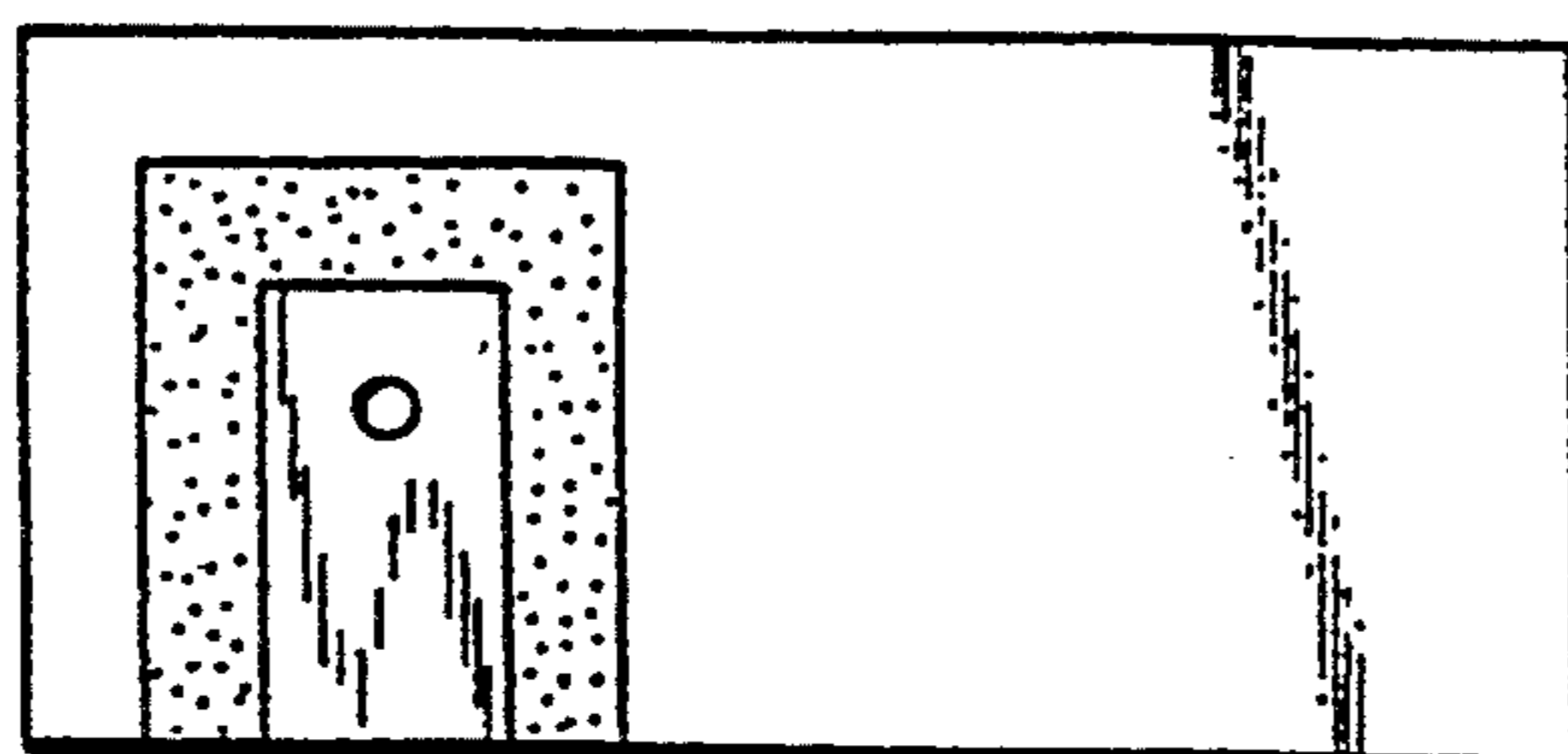


FIG.30

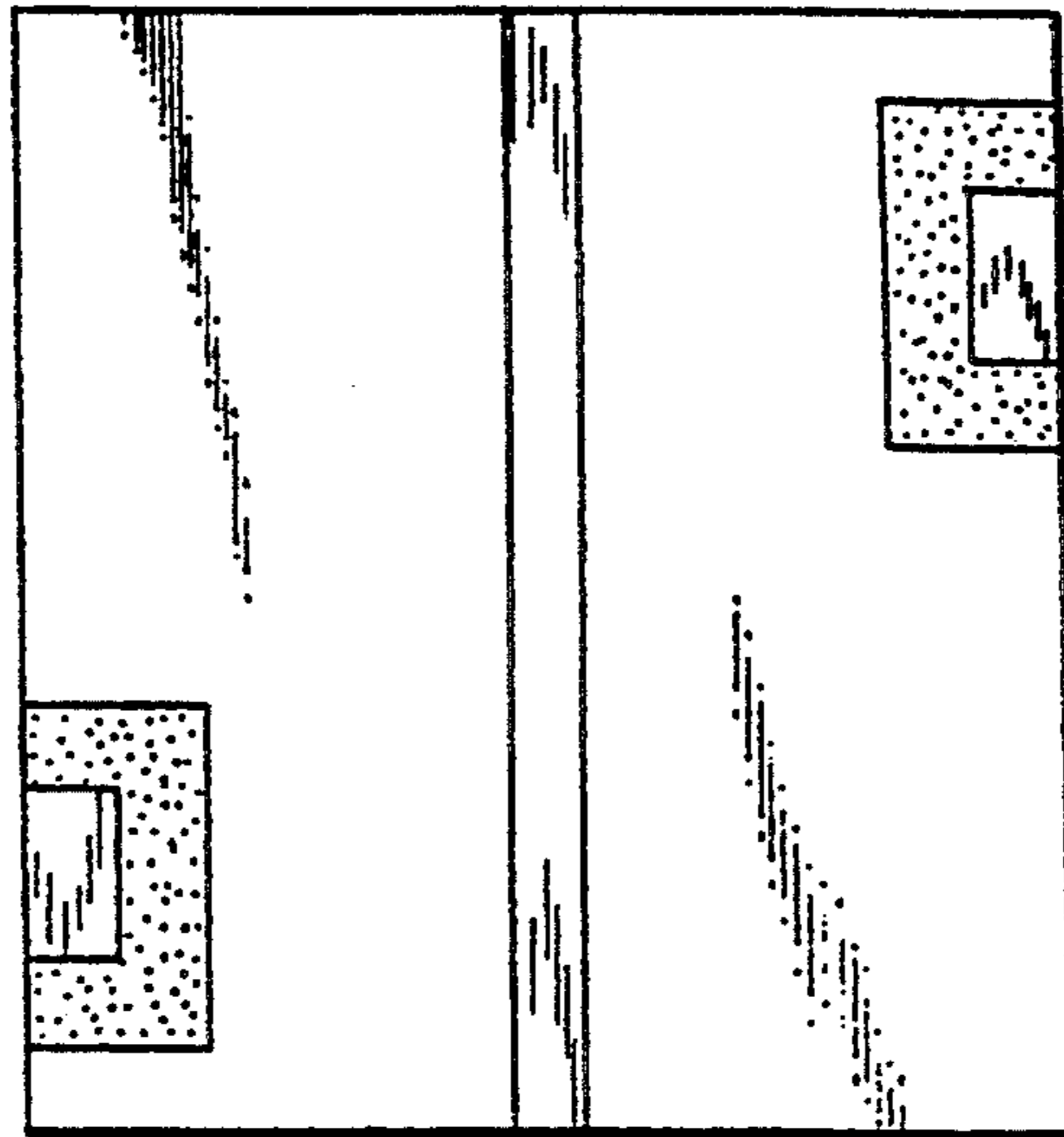


FIG.31

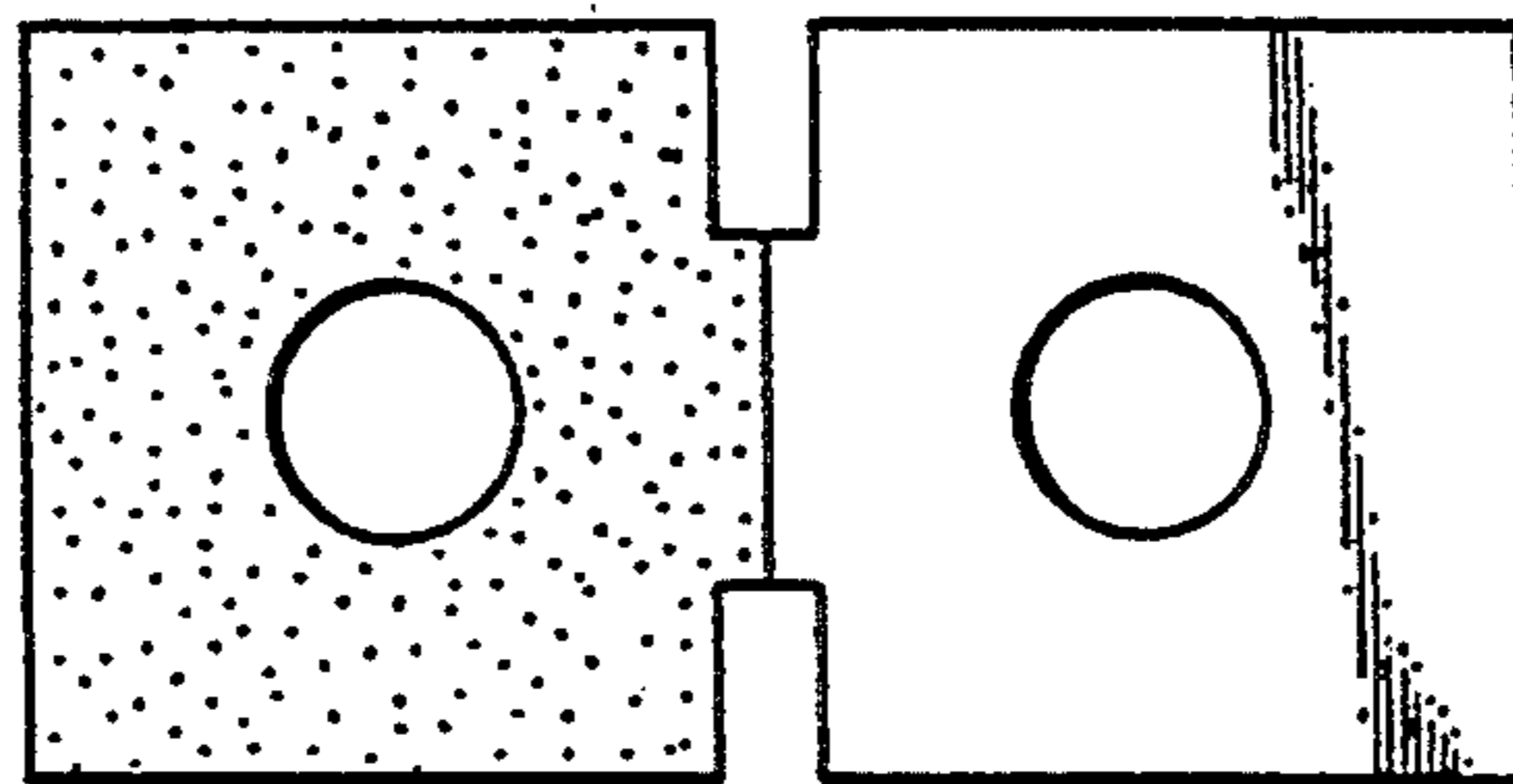


FIG.32

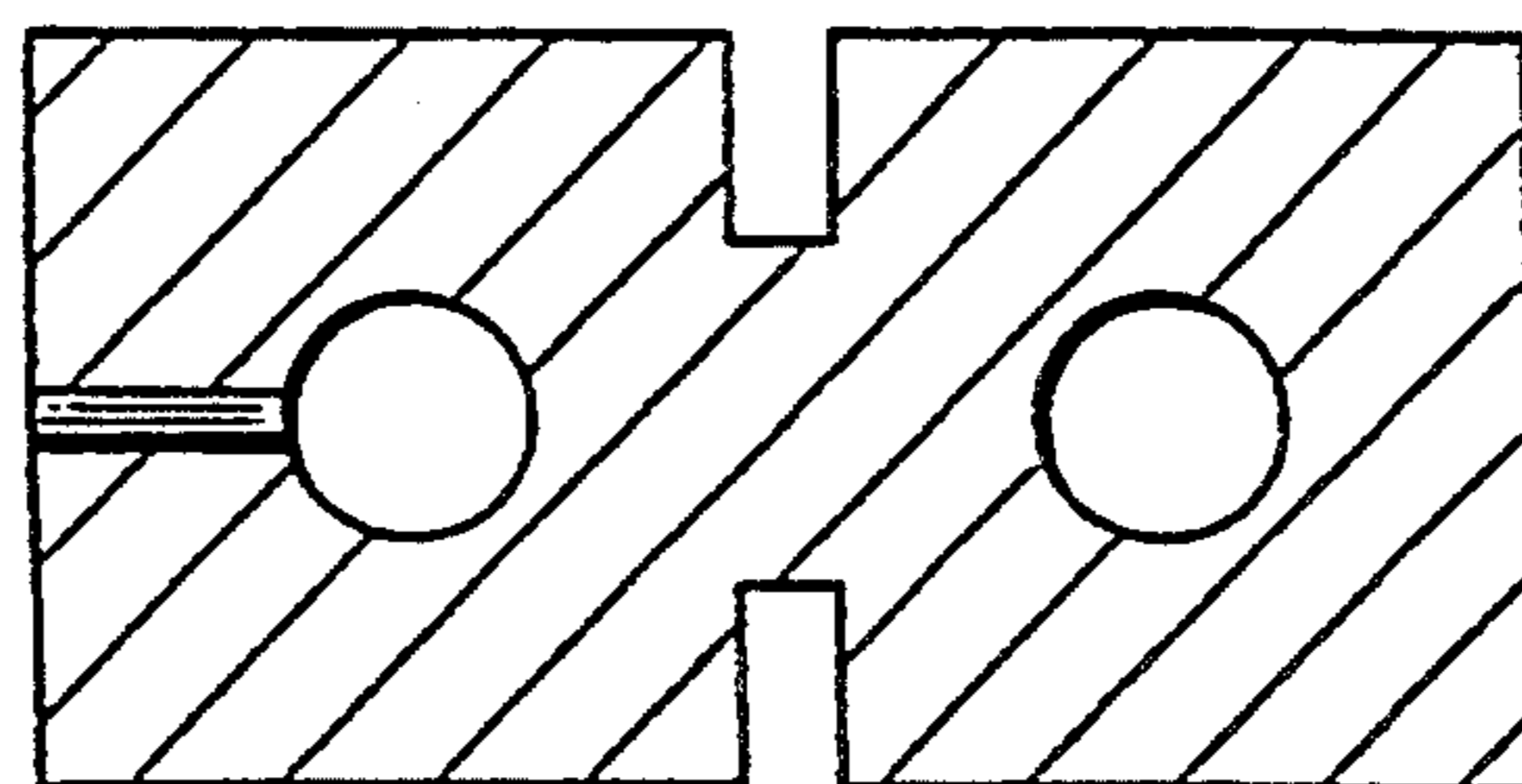


FIG. 33

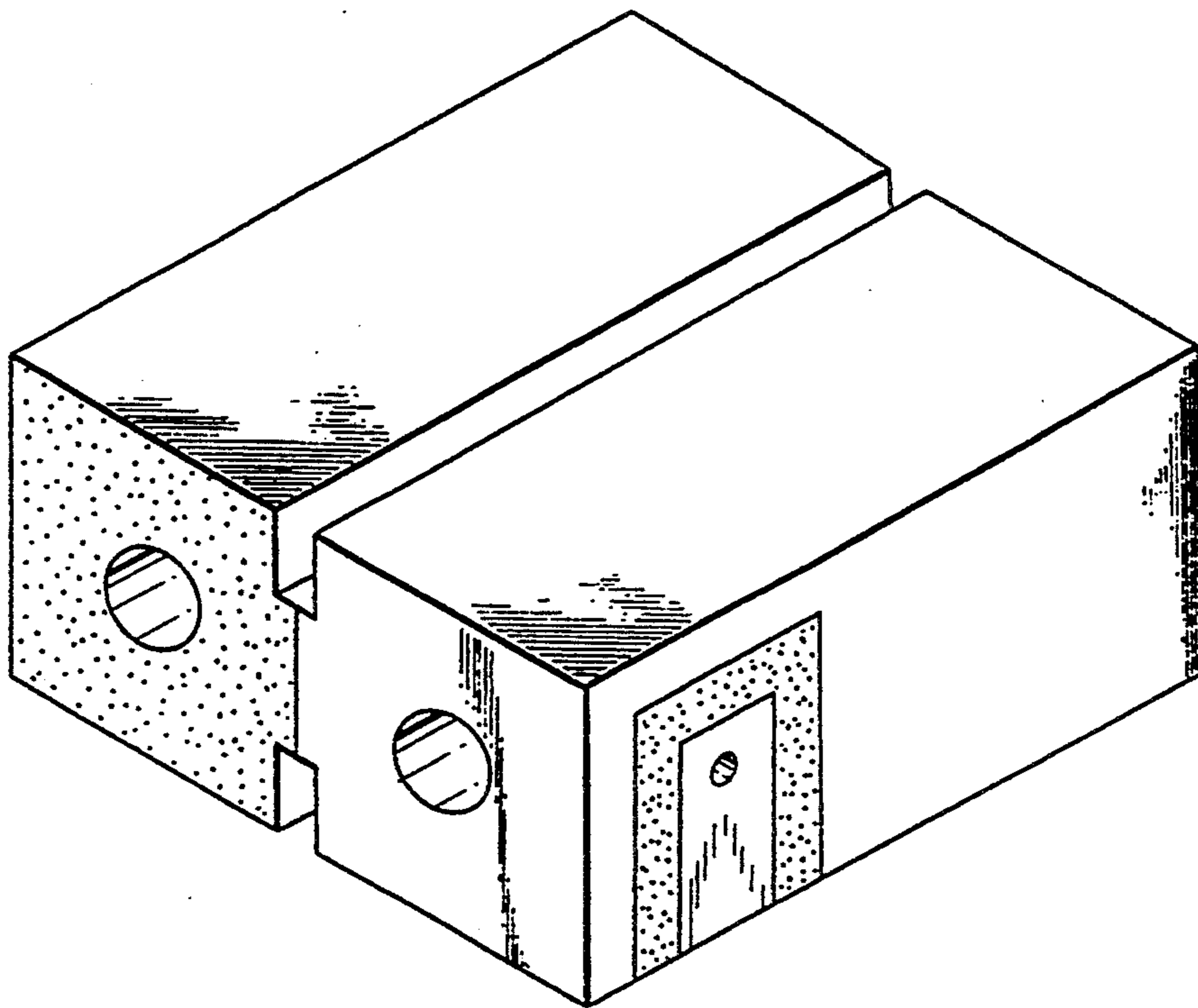


FIG. 34

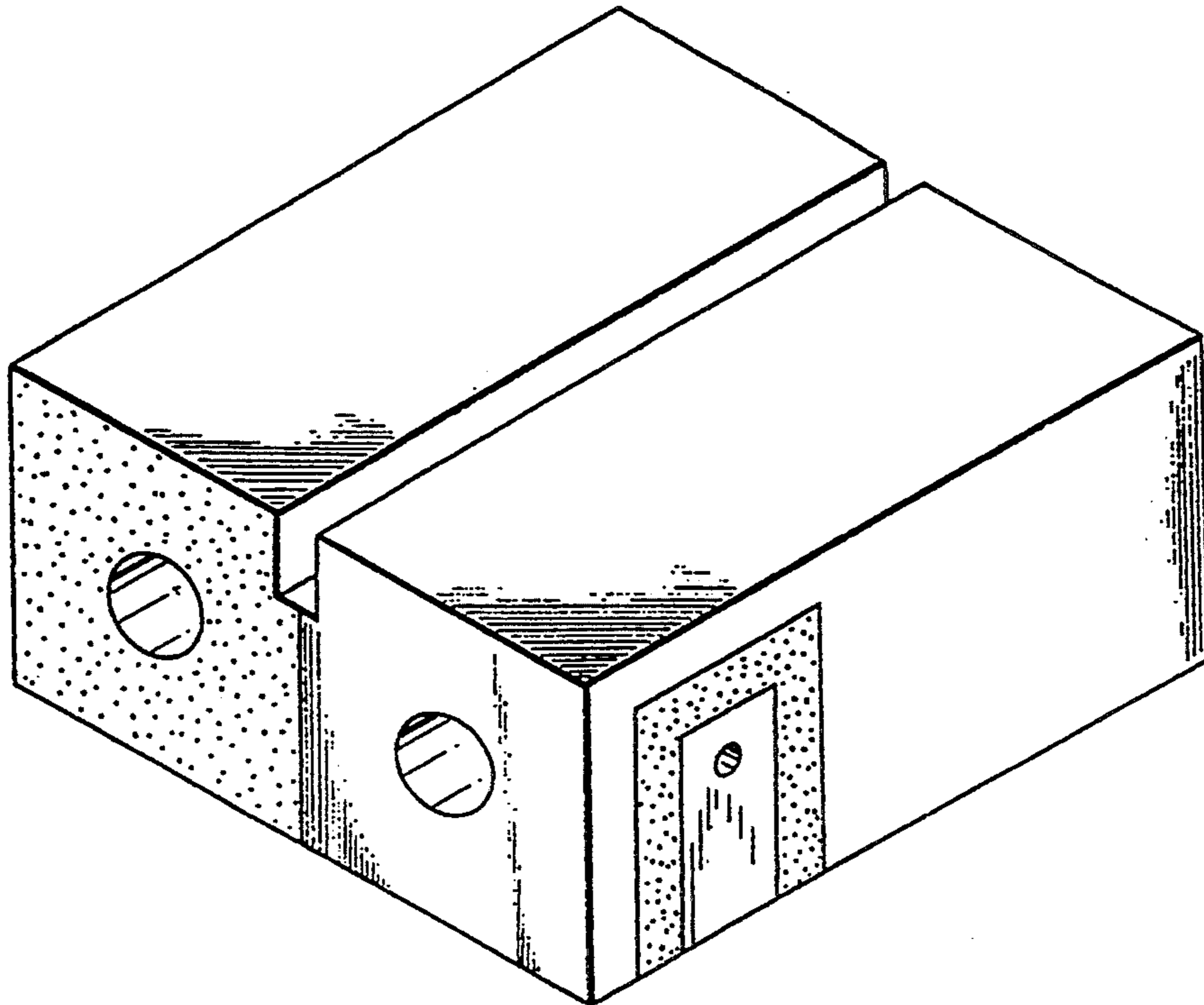


FIG. 35

