



US00D834966S

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

(10) **Patent No.:** **US D834,966 S**  
(45) **Date of Patent:** **\*\* Dec. 4, 2018**

(54) **CAPILLARY RHEOMETER FOR MEASURING DOUGH VISCOSITY**

4,587,837 A \* 5/1986 Newbould ..... G01N 11/04  
73/54.04

(71) Applicant: **INVESTIGACION TECNINCA AVANZADA, S.A. de C.V.**, Guadalupe N.L. (MX)

4,879,897 A \* 11/1989 Booth ..... G01N 11/14  
73/54.31  
D331,202 S \* 11/1992 Jeffers ..... D10/78  
(Continued)

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**FOREIGN PATENT DOCUMENTS**

CN 303247046 \* 6/2015

(73) Assignee: **GRUMA S.A.B. DE C.V.**, San Pedro Garza Garcia (MX)

**OTHER PUBLICATIONS**

Saki, "Reactive melt blending of low-density polyethylene with poly (acrylic acid)", Arabian Journal of Chemistry (2015) 8, 191-199.

(\*\*) Term: **15 Years**

(Continued)

(21) Appl. No.: **29/596,243**

*Primary Examiner* — Susan Bennett Hattan

(22) Filed: **Mar. 7, 2017**

*Assistant Examiner* — Leanne Was-Englehart

(51) **LOC (11) Cl.** ..... **10-05**

(74) *Attorney, Agent, or Firm* — Young & Thompson

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

USPC ..... **D10/58**

(58) **Field of Classification Search**

USPC ..... D7/323, 368, 376, 381; D10/46.2, 58, D10/78, 81, 83, 84, 96, 97, 98, 99, 100, D10/101

CPC ..... G01N 19/04; G01N 33/10

See application file for complete search history.

(57) **CLAIM**

The ornamental design for a capillary rheometer for measuring dough viscosity, as shown and described.

**DESCRIPTION**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

D58,035 S *	5/1921	Booth et al. ....	D7/376
D109,615 S *	5/1938	Lauterbur .....	D7/376
D115,511 S *	7/1939	Van Doren .....	D7/376
D118,271 S *	12/1939	Van Doren et al. ....	D7/368
2,342,093 A *	2/1944	Weida .....	A21C 5/00 425/311
2,638,066 A *	5/1953	De Ridder .....	A21C 5/02 425/238
3,788,139 A *	1/1974	Rubio .....	G01N 19/04 73/169
3,789,660 A	2/1974	Rubio et al.	

FIG. 1 is a top, front, and right side perspective view of a capillary rheometer for measuring dough viscosity showing the new design;

FIG. 2 is a top, front, and left side, perspective view thereof;

FIG. 3 is a front elevation view thereof;

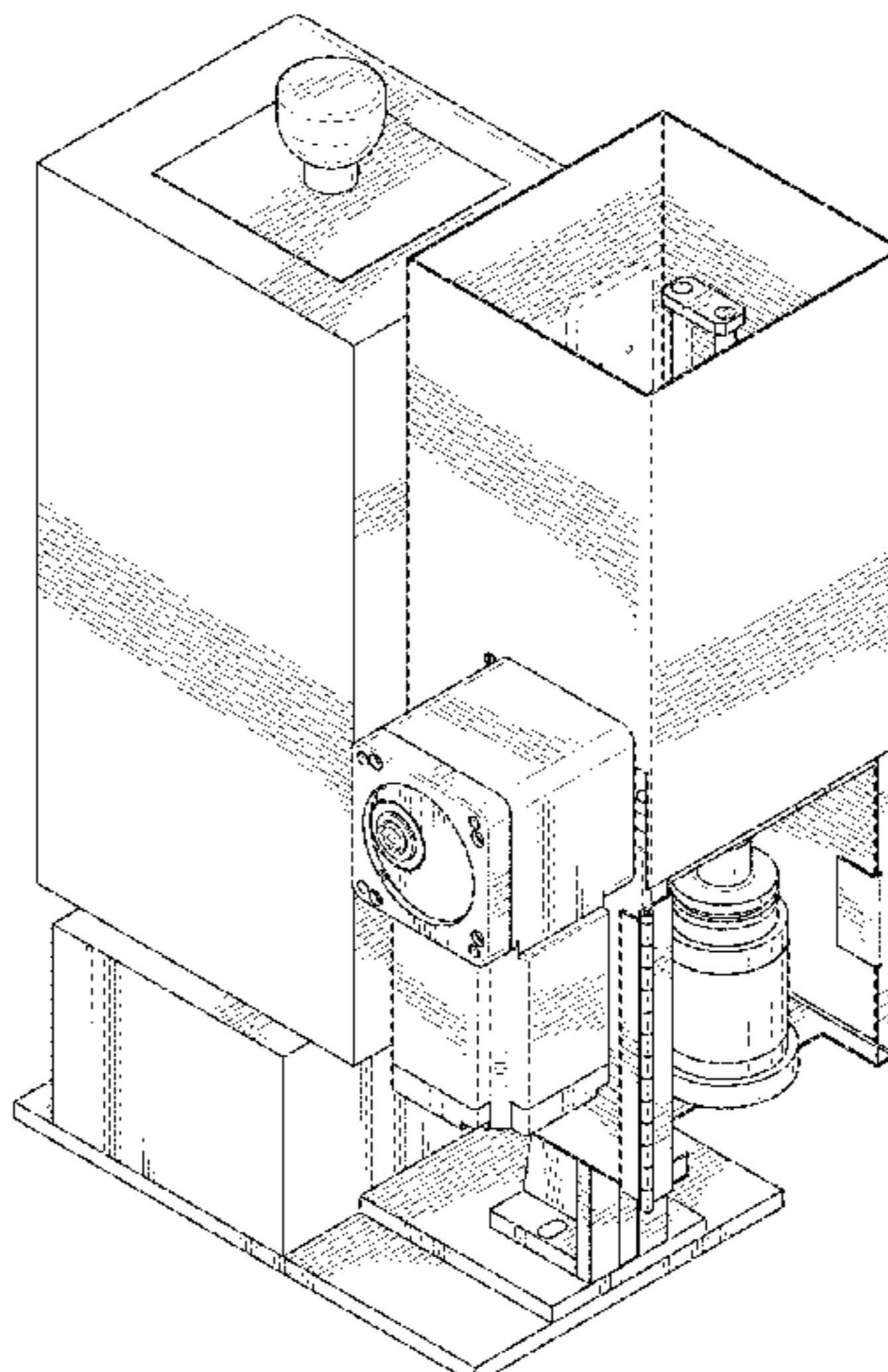
FIG. 4 is a right side elevation view thereof;

FIG. 5 is a left side elevation view thereof; and,

FIG. 6 is a top plan view thereof.

The broken lines shown in the drawings illustrate portions of the capillary rheometer for measuring dough viscosity that from no part of the claimed design.

**1 Claim, 6 Drawing Sheets**



(56)

**References Cited**

## U.S. PATENT DOCUMENTS

5,209,107 A \* 5/1993 Grudzien, Jr. .... G01N 11/08  
73/54.14  
5,258,601 A \* 11/1993 Takano ..... G01N 11/04  
219/485  
5,347,851 A \* 9/1994 Grudzien, Jr. .... G01L 9/0077  
374/56  
D555,420 S \* 11/2007 Voss ..... D7/376  
D688,514 S \* 8/2013 Lin ..... D7/368  
8,935,108 B2 \* 1/2015 Kasten ..... G01N 11/12  
702/50  
2010/0166902 A1 \* 7/2010 Kuribayashi ..... A21C 5/00  
425/140

## OTHER PUBLICATIONS

Lawton, "Viscoelasticity of Zein-Starch Doughs", Cereal Chem., vol. 69, No. 4, 1992, pp. 351-355.

Bazua et al., "Extruded Corn Flour As an Alternative to Lime-Heated Corn Flour for Tortilla Preparation", Journal of Food Science, vol. 44, 1979, pp. 940-941.

"Rheometer and extruder solutions for the food industry", Thermo Fisher Scientific, 2016, pp. 1-4.

Néñez-Santiago et al., "Rheological evaluation of non-Newtonian Mexican nixtamalised maize and dry processed masa flours" Journal of Food Engineering 60 (2013), pp. 55-66.

Mondragón et al., "Viscoelastic behavior of nixtamalized maize starch gels", Carbohydrate Polymers 65 (2006) 314-320.

\* cited by examiner

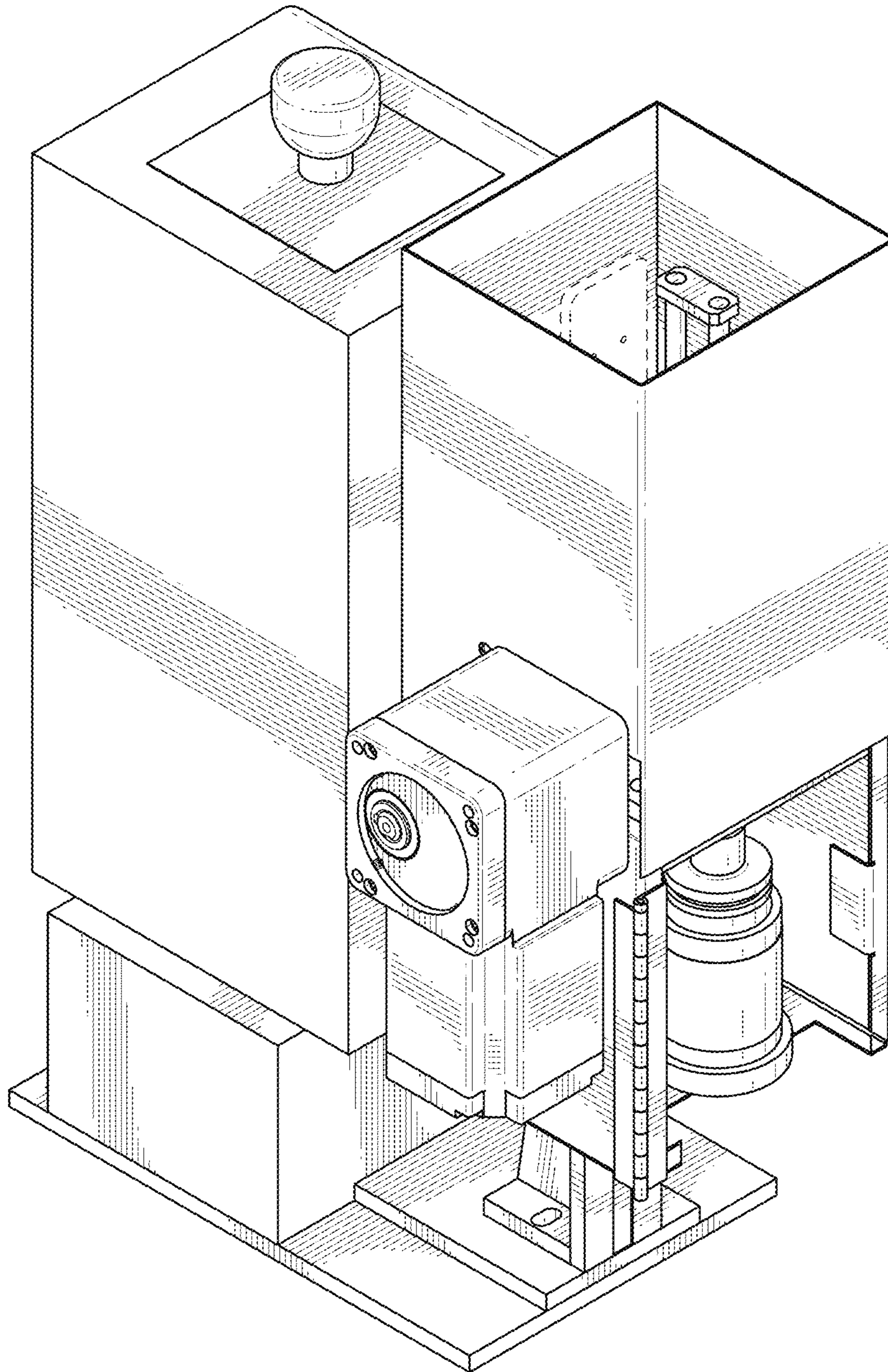


FIG.1

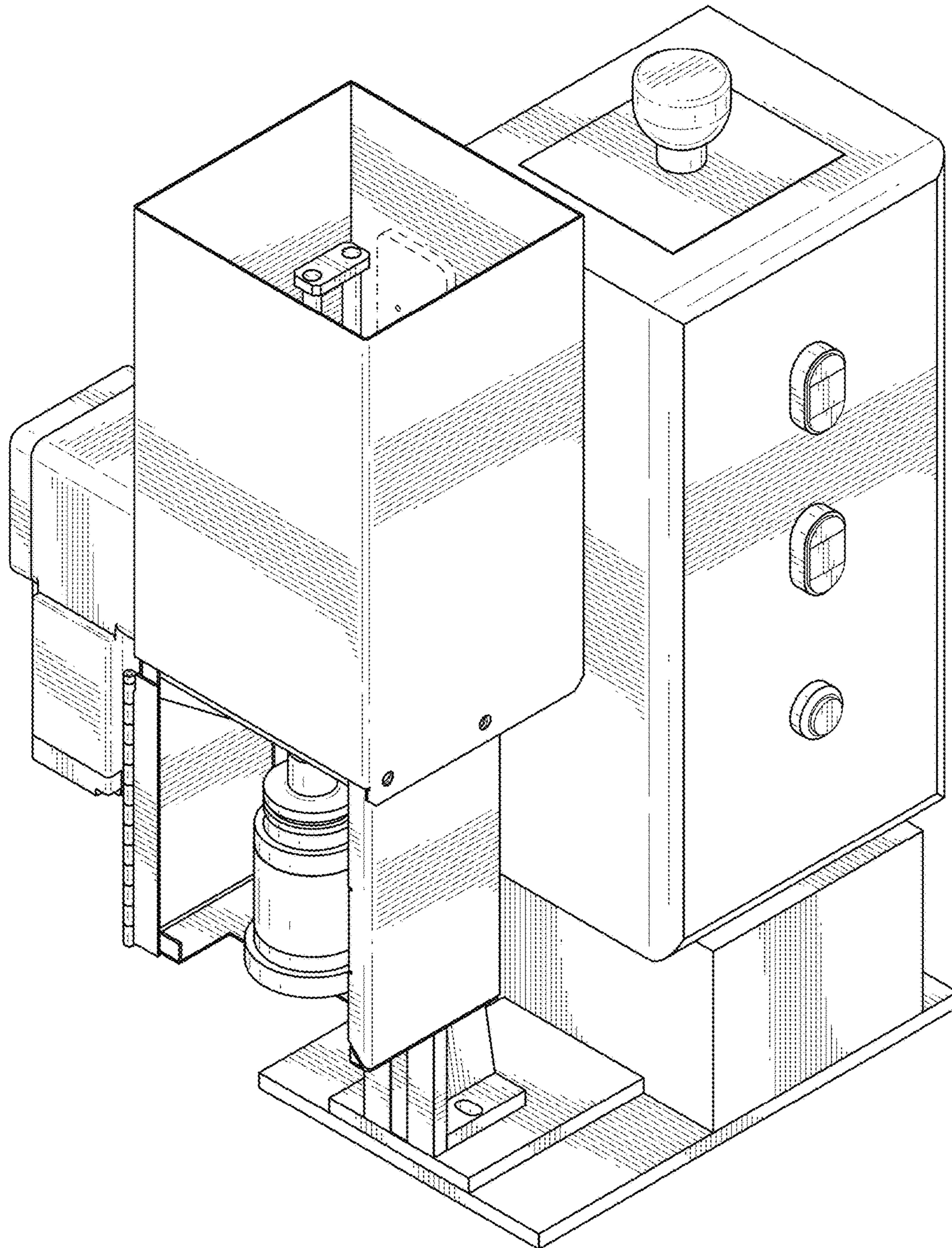


FIG.2

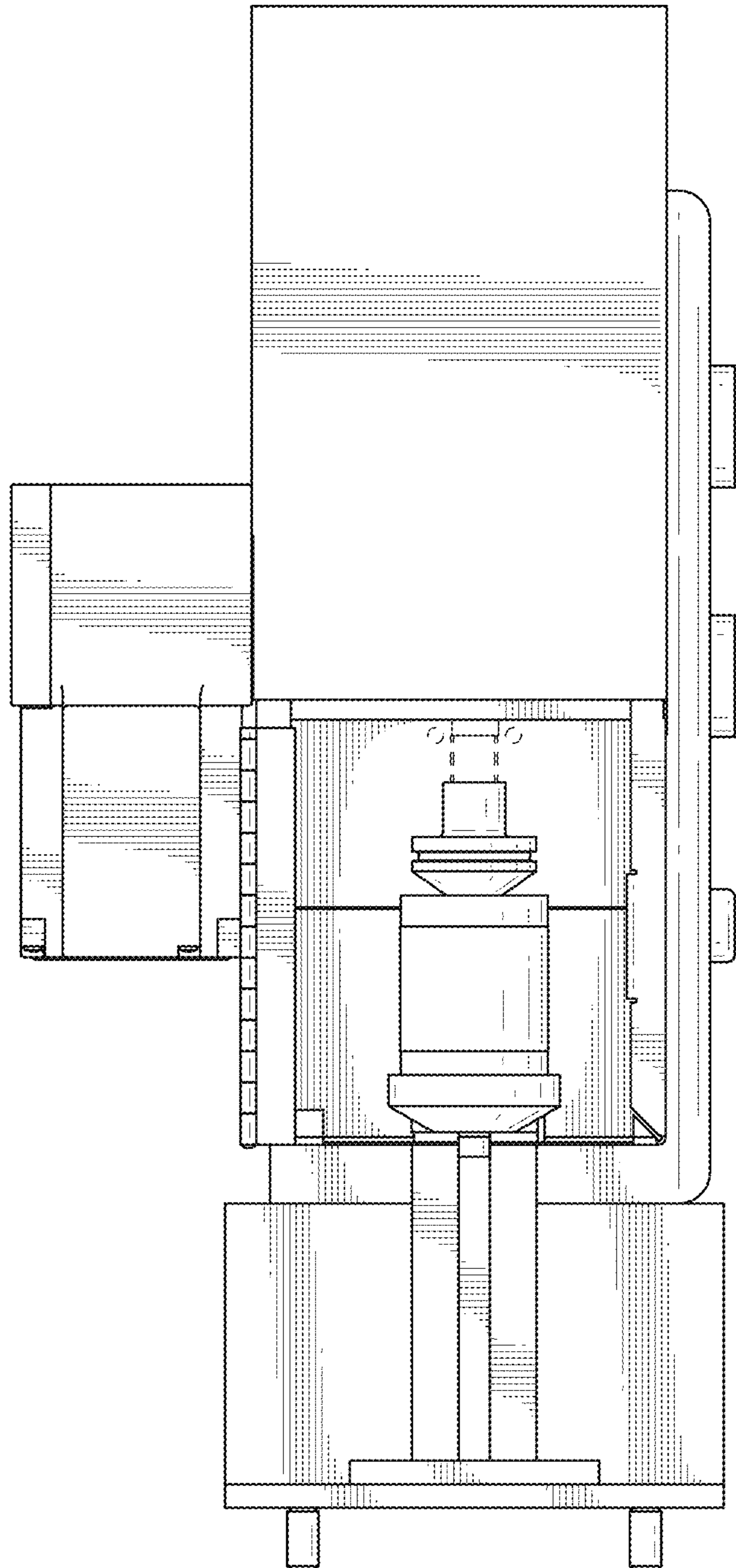


FIG.3

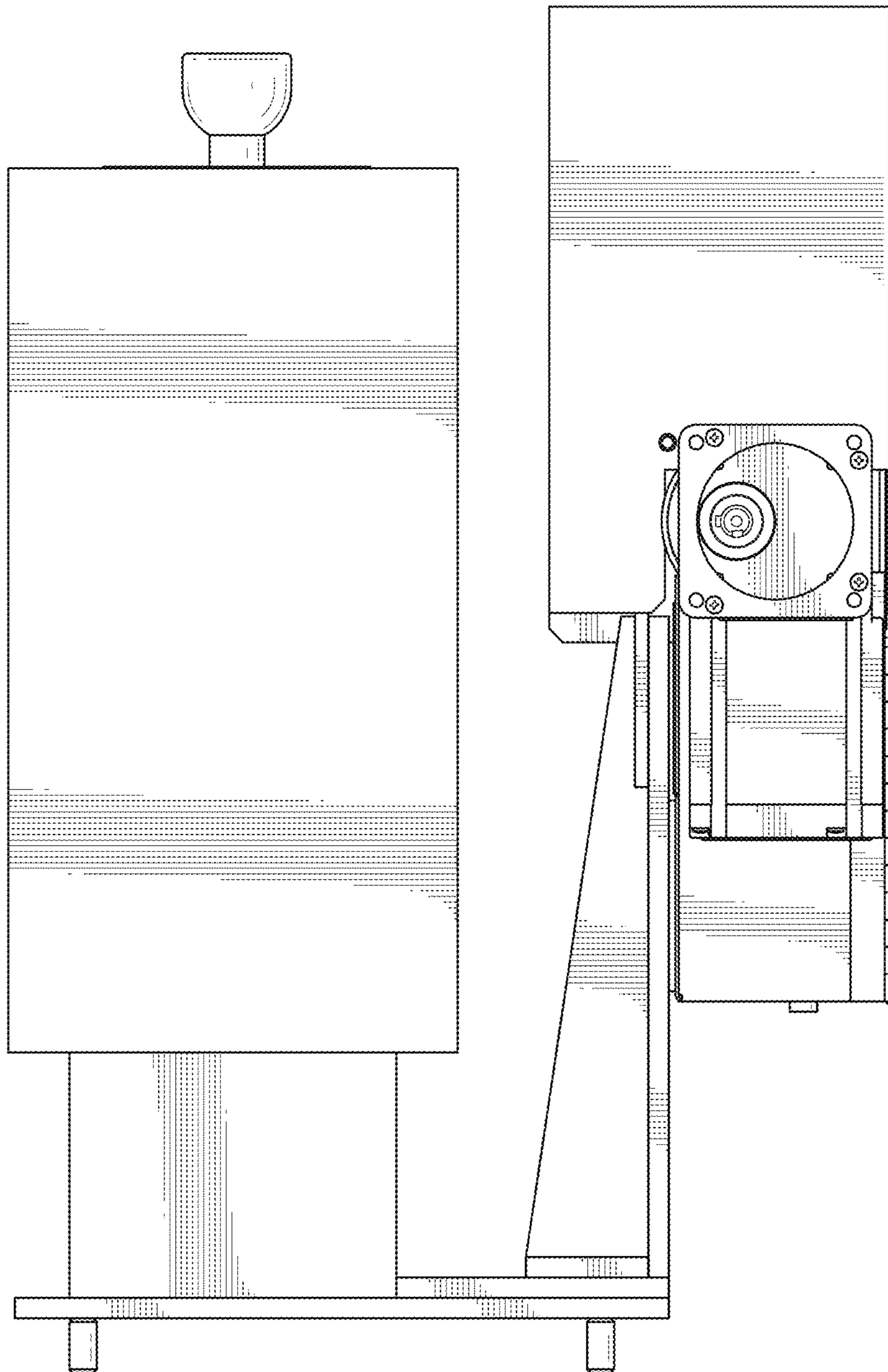


FIG.4

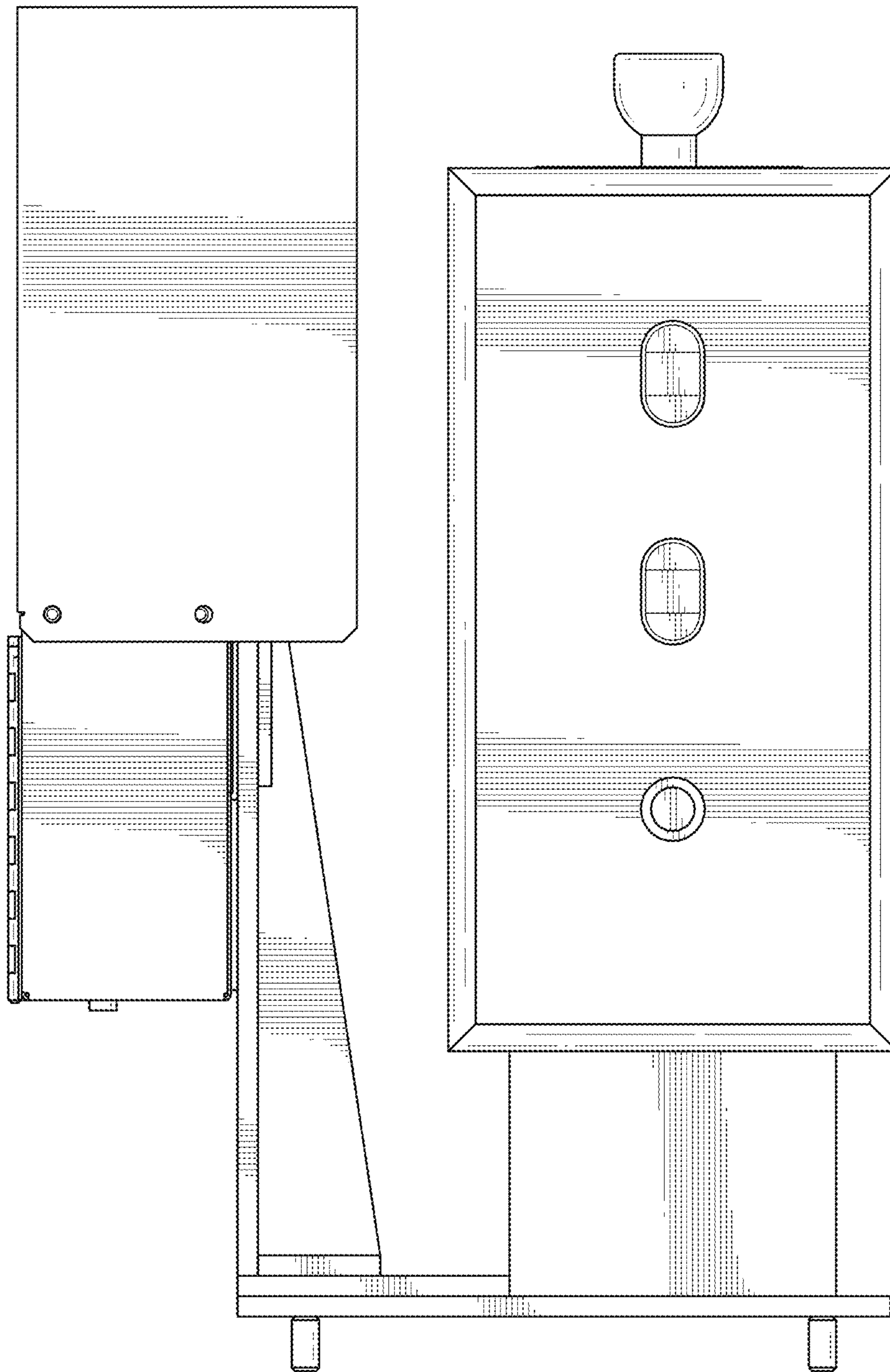


FIG.5

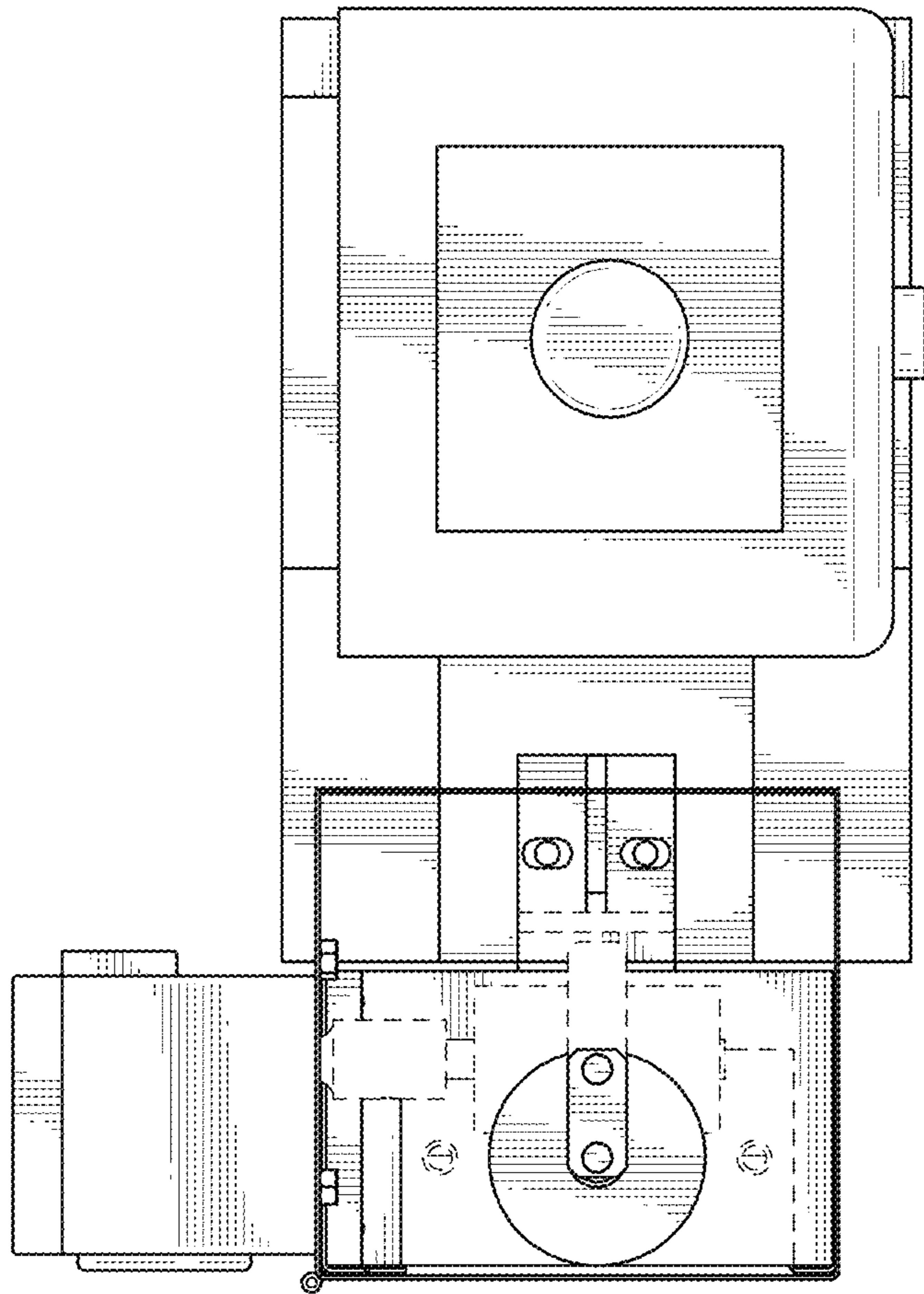


FIG.6



UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : D834,966 S  
APPLICATION NO. : 29/596243  
DATED : December 4, 2018  
INVENTOR(S) : Felipe A. Rubio et al.

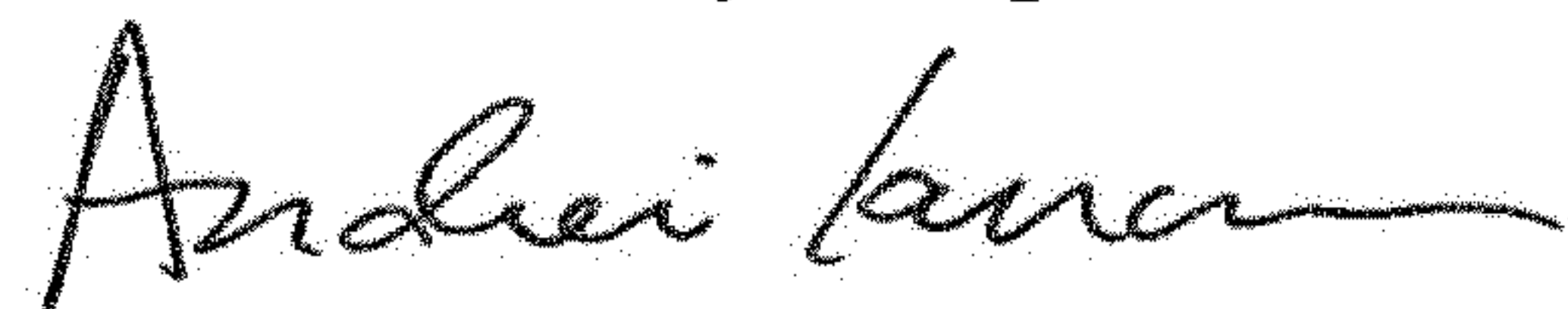
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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page

Item (57), In the Description, Line 11, change "from no part of the claimed design." to -- form no part of the claimed design. --

Signed and Sealed this  
Thirtieth Day of April, 2019



Andrei Iancu  
*Director of the United States Patent and Trademark Office*