

# Front pages of 7 granted US patents



(12) **United States Patent**  
**Trakhimovich**

(10) **Patent No.:** **US 10,704,951 B2**  
(45) **Date of Patent:** **Jul. 7, 2020**

- (54) **LOW-PROFILE LOAD CELL ASSEMBLY WITH VERTICAL WEIGHT ADAPTER**
- (71) Applicant: **SHEKEL SCALES (2008) LTD.**, Beit Keshet (IL)
- (72) Inventor: **Michael Trakhimovich**, Gan Ner (IL)
- (73) Assignee: **SHEKEL SCALES (2008) LTD.**, Beit Keshet (IL)
- (\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

- (21) Appl. No.: **16/351,727**
- (22) Filed: **Mar. 13, 2019**
- (65) **Prior Publication Data**  
US 2019/0301921 A1 Oct. 3, 2019

- Related U.S. Application Data**
- (63) Continuation of application No. 15/329,126, filed as application No. PCT/IB2015/055905 on Aug. 3, 2015, now Pat. No. 10,274,359.

- (30) **Foreign Application Priority Data**  
Aug. 3, 2014 (GB) ..... 1413735.0

- (51) **Int. Cl.**  
**G01G 3/14** (2006.01)  
**G01G 21/14** (2006.01)
- (52) **U.S. Cl.**  
CPC ..... **G01G 3/1412** (2013.01); **G01G 21/14** (2013.01)

- (58) **Field of Classification Search**  
CPC ..... G01G 3/1412; G01G 21/14  
USPC ..... 177/187  
See application file for complete search history.

- (56) **References Cited**  
U.S. PATENT DOCUMENTS

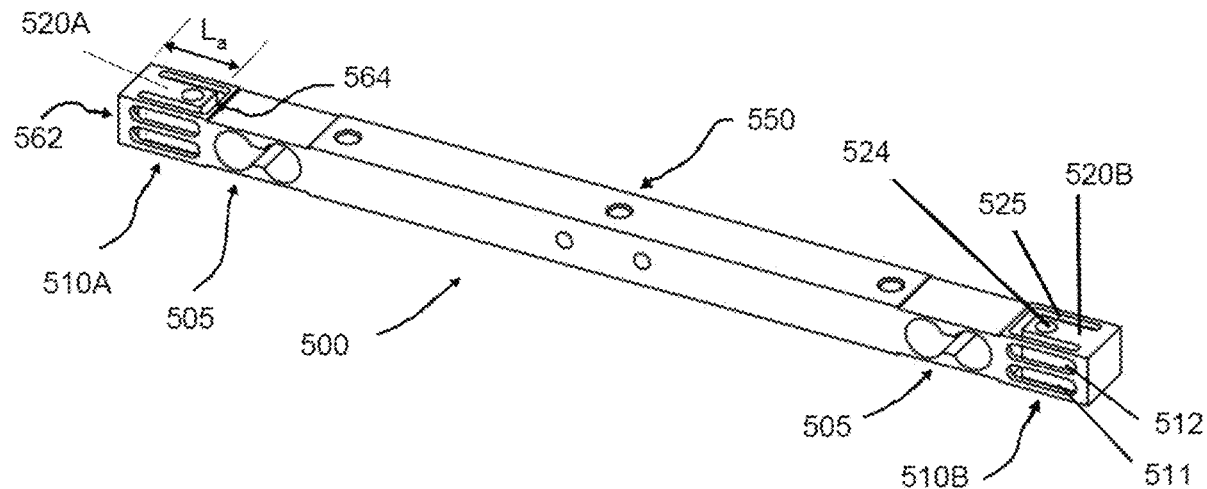
3,985,025 A *	10/1976	Ormond .....	G01L 1/2231 177/255
4,546,838 A *	10/1985	Ormond .....	G01G 21/12 177/211
4,600,066 A *	7/1986	Griffen .....	G01G 3/1412 177/211
2005/0000304 A1*	1/2005	Smith .....	G01B 7/18 73/862.637
2014/0262557 A1*	9/2014	Johnson .....	G01G 3/14 177/211

\* cited by examiner

*Primary Examiner* — Natalie Huls  
*Assistant Examiner* — Monica S Young  
(74) *Attorney, Agent, or Firm* — Marc Van Dyke;  
Momentum IP Group

- (57) **ABSTRACT**  
A load cell assembly, including an adapter adapted to receive a vertical load, and having loaded and unloaded dispositions a load cell body including a spring element having a first cutout window defined by a top beam and a bottom beam, the window transversely disposed through the body, the spring element adapted such that responsive to a downward force exerted on a top face of the adapter, the beams assume a primary double-bending configuration a strain-sensing gage, attached to the spring element, the strain-sensing gage for measuring strain in the spring element; and an at least two-dimensional flexural member having a second cutout window, the second cutout window being transversely disposed through the body; the adapter disposed in mechanical relation to the flexural member such that, in the loaded disposition of the adapter, the flexural member assumes a secondary, substantially double-bending configuration.

**20 Claims, 5 Drawing Sheets**





US010641643B2

(12) **United States Patent**  
**Trakhimovich**

(10) **Patent No.:** **US 10,641,643 B2**  
(45) **Date of Patent:** **May 5, 2020**

(54) **LOAD CELL ASSEMBLY HAVING A FLEXURAL ARRANGEMENT**

(71) Applicant: **Shekel Scales Co. (2008) Ltd.**, Kibbutz Beit-Keshet (IL)

(72) Inventor: **Michael Trakhimovich**, Gan Ner (IL)

(73) Assignee: **Shekel Scales Co. (2008) Ltd.**, Kibbutz Beit-Keshet (IL)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 318 days.

(21) Appl. No.: **15/676,409**

(22) Filed: **Aug. 14, 2017**

(65) **Prior Publication Data**

US 2018/0031412 A1 Feb. 1, 2018

**Related U.S. Application Data**

(63) Continuation of application No. 14/398,467, filed as application No. PCT/IB2013/000821 on May 2, 2013, now Pat. No. 9,766,113.

(30) **Foreign Application Priority Data**

May 2, 2012 (GB) ..... 1207656.8

(51) **Int. Cl.**  
**G01G 3/14** (2006.01)  
**G01G 23/06** (2006.01)  
**G01G 21/22** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **G01G 3/1402** (2013.01); **G01G 3/1412** (2013.01); **G01G 21/22** (2013.01); **G01G 23/06** (2013.01)

(58) **Field of Classification Search**  
CPC .... G01G 3/1402; G01G 3/1412; G01G 21/22; G01G 23/06

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,985,025 A \* 10/1976 Ormond ..... G01L 1/2231  
177/255  
4,107,985 A \* 8/1978 Sommer ..... G01G 3/08  
177/211

(Continued)

FOREIGN PATENT DOCUMENTS

FR 2660433 A 10/1991  
GB 1207656.8 5/2012

(Continued)

OTHER PUBLICATIONS

International Search Report for PCT/IB2013/000821, search report dated Nov. 7, 2013.

(Continued)

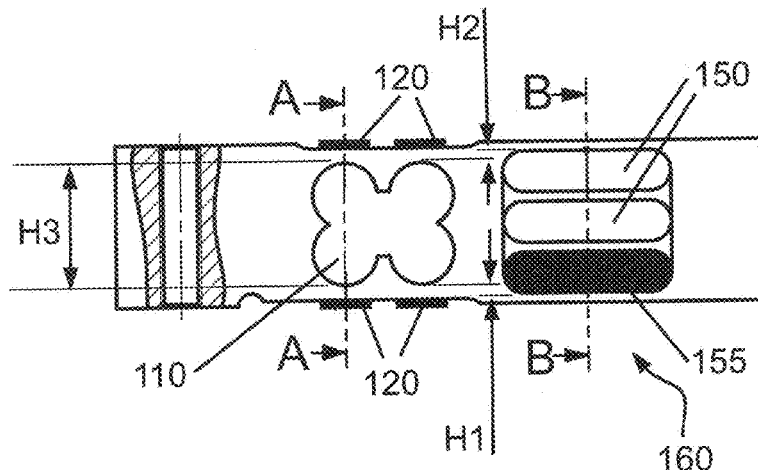
*Primary Examiner* — Natalie Huls

(74) *Attorney, Agent, or Firm* — Marc Van Dyke; Momentum IP Group

(57) **ABSTRACT**

A weighing scale and a load cell assembly therefor, the weighing scale including: (a) a weighing platform; (b) a base; and (c) a load cell arrangement including: (i) a load cell body, disposed below the platform and above the base, the body secured to the platform at a first position along a length of the body, and secured to the base at a second position along the length, the load cell body having a first cutout window transversely disposed through the body, the window adapted such that a downward force exerted on a top face of the weighing platform distorts the window to form a distorted window; and (ii) at least one strain-sensing gage, mounted on at least a first surface of the load cell body, the strain-sensing gage adapted to measure a strain in the first surface; and (d) an at least a one-dimensional flexure arrangement having at least a second cutout window transversely disposed through the body, the second cutout win-

(Continued)



(12) **United States Patent**  
**Trakhimovich**

(10) **Patent No.:** **US 10,274,359 B2**  
(45) **Date of Patent:** **Apr. 30, 2019**

(54) **LOW-PROFILE LOAD CELL ASSEMBLY HAVING FLEXURAL MEMBERS WITH DOUBLE-BENDING BEHAVIOR**

(71) Applicant: **SHEKEL SCALES (2008) LTD.**, Beit Keshet (IL)

(72) Inventor: **Michael Trakhimovich**, Gan Ner (IL)

(73) Assignee: **Shekel Scales Co. (2008) Ltd.**, Kibbutz Beit-Keshet (IL)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 28 days.

(21) Appl. No.: **15/329,126**

(22) PCT Filed: **Aug. 3, 2015**

(86) PCT No.: **PCT/IB2015/055905**

§ 371 (c)(1),  
(2) Date: **Jan. 25, 2017**

(87) PCT Pub. No.: **WO2016/020840**

PCT Pub. Date: **Feb. 11, 2016**

(65) **Prior Publication Data**

US 2017/0211965 A1 Jul. 27, 2017

(30) **Foreign Application Priority Data**

Aug. 3, 2014 (GB) ..... 1413735.0

(51) **Int. Cl.**  
**G01G 3/14** (2006.01)  
**G01G 21/14** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **G01G 3/1412** (2013.01); **G01G 21/14** (2013.01)

(58) **Field of Classification Search**  
CPC ..... G01G 3/1412; G01G 21/14  
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,985,025 A \* 10/1976 Ormond ..... G01L 1/2231  
177/255  
4,150,729 A \* 4/1979 Ormond ..... G01G 3/1404  
177/156

(Continued)

FOREIGN PATENT DOCUMENTS

CN 2276152 Y 3/1998  
CN 2436383 Y 6/2001

(Continued)

OTHER PUBLICATIONS

International Search Report for PCT/IB2015/055905, dated Nov. 18, 2015.

(Continued)

*Primary Examiner* — Natalie Huls

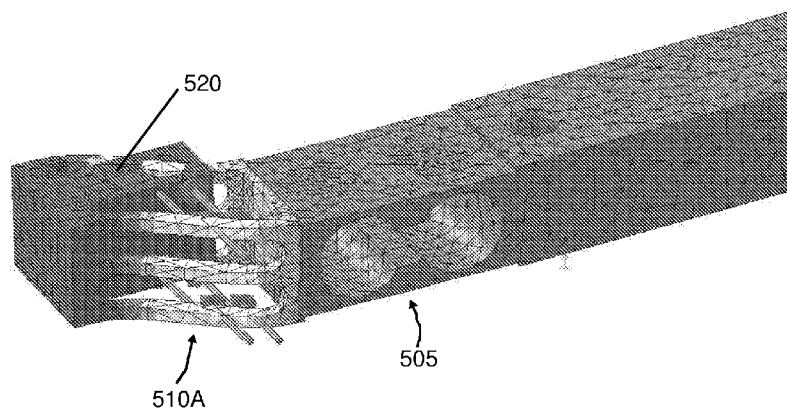
*Assistant Examiner* — Monica S Young

(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A load cell assembly, including an adapter adapted to receive a vertical load, and having loaded and unloaded dispositions; a load cell body including a spring element having a first cutout window defined by a top beam and a bottom beam, the window transversely disposed through the body, the spring element adapted such that responsive to a downward force exerted on a top face of the adapter, the beams assume a primary double-bending configuration; a strain-sensing gage, attached to the spring element, the strain-sensing gage for measuring strain in the spring element; and an at least two-dimensional flexural member having a second cutout window, the second cutout window being transversely disposed through the body; the adapter disposed in mechanical relation to the flexural member such that, in the loaded disposition of the adapter, the flexural member

(Continued)





US00D681488S

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

(10) **Patent No.:** **US D681,488 S**

(45) **Date of Patent:** **\*\* May 7, 2013**

(54) **WEIGHING SCALE DISPLAY**

(75) Inventors: **Eitan Shiloh**, Tel-Aviv (IL); **Offer Shalev**, Misgav (IL)

(73) Assignee: **Shekel Scales Co. (2008) Ltd.**, Kibbutz Beit-Keshet (IL)

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

(21) Appl. No.: **29/403,340**

(22) Filed: **Oct. 5, 2011**

(51) **LOC (9) Cl.** ..... **10-04**

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

USPC ..... **D10/94**; D10/103

(58) **Field of Classification Search** ..... D10/88-91, D10/94, 103; 177/25.13-25.18, 177-182, 177/211-214, 210 R, 210 C, 210 GM, 210 FP, 177/210 PP, 210 EM, 148, 236-245, DIG. 3  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

D350,075 S *	8/1994	Reeder .....	D10/94
D431,482 S *	10/2000	Marmier .....	D10/94
D547,220 S *	7/2007	Bechtel et al. ....	D10/93
D645,368 S *	9/2011	Shiloh et al. ....	D10/93

**OTHER PUBLICATIONS**

Rice Lake Healthometer copyright 2009, downloaded Oct. 2010, publication date unknown.

Healthometer Professional Product Catalog 2009, Downloaded Oct. 2010, publication date unknown.

Soehnle Highlights 2009/2010 Vorsprung Durch Innovation, Downloaded Oct. 2010, publication date unknown.

\* cited by examiner

*Primary Examiner* — Antoine D Davis

(57) **CLAIM**

The ornamental design for a weighing scale display, as shown and described.

**DESCRIPTION**

FIG. 1 is a top view of a weighing scale display according to our new design;

FIG. 2 is a bottom view of the weighing scale display shown in FIG. 1;

FIG. 3 is a front view of the weighing scale display shown in FIG. 1;

FIG. 4 is a back view of the weighing scale display shown in FIG. 1;

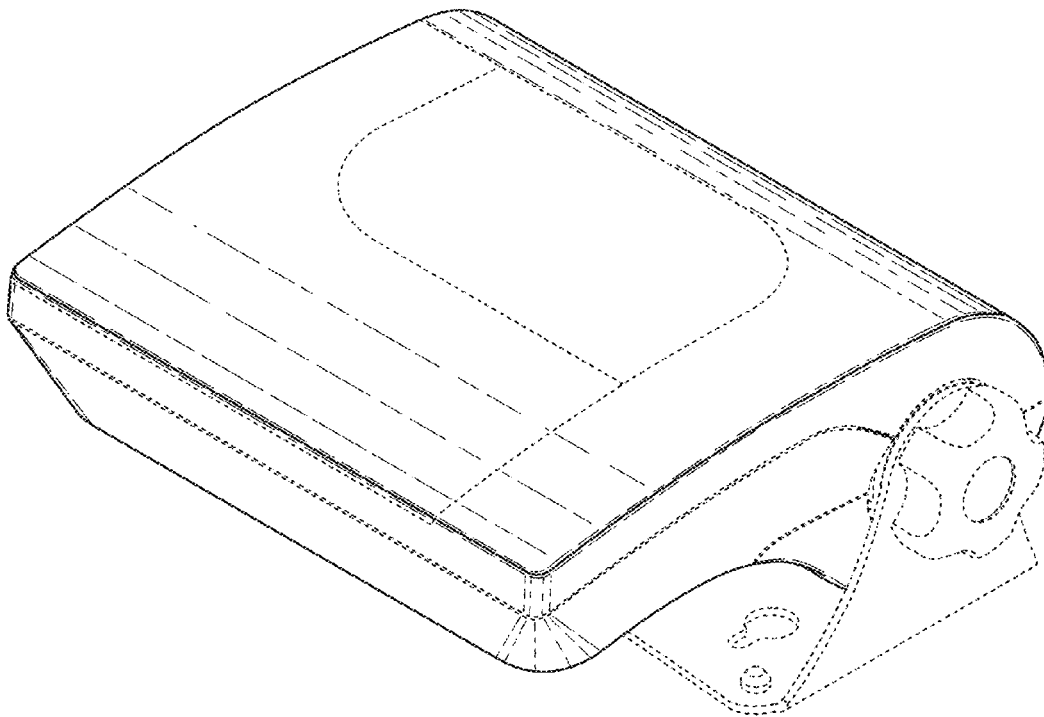
FIG. 5 is a left side view of the weighing scale display shown in FIG. 1;

FIG. 6 is a right side view of the weighing scale display shown in FIG. 1; and,

FIG. 7 is a perspective view of the weighing scale display shown in FIG. 1.

The claimed design is shown in relatively bold lines. The broken lines are for the purpose of illustrating portions of the weighing scale display and form no part of the claimed design.

**1 Claim, 5 Drawing Sheets**





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

(10) **Patent No.:** **US D674,298 S**  
(45) **Date of Patent:** **\*\* Jan. 15, 2013**

(54) **INFANT WEIGHING SCALE**

(75) Inventors: **Ram Hillel**, Yuvalim (IL); **Offer Shalev**, Misgav (IL)

(73) Assignee: **Shekel Scales Co. (2008) Ltd.**, Kibbutz Beit-Keshet (IL)

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

(21) Appl. No.: **29/409,793**

(22) Filed: **Dec. 29, 2011**

(51) **LOC (9) Cl.** ..... **10-04**

(52) **U.S. Cl.** ..... **D10/94**

(58) **Field of Classification Search** ..... D10/88-91, D10/94; 177/25.13-25.18, 177-182, 211-214, 177/210 R, 210 C, 210 GM, 210 FP, 210 PP, 177/210 EM, 148, 236-245, DIG. 3, 126, 177/262

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

D614,518 S \* 4/2010 Li et al. .... D10/91

**OTHER PUBLICATIONS**

- Infant Scale—listed on Internet as Baby\_Scale.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.
- Infant Scale—listed on Internet as webbaby2010.gif—date is unknown—downloaded from the Internet on Mar. 1, 2012.
- Infant Scale—listed on Internet as Baby-Scale-ATZ-A10-.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.
- Infant Scale—listed on Internet as Baby-Scale.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.
- Infant Scale—listed on Internet as Shekel\_Baby\_Scal\_Model\_T15P.gif—date is unknown—downloaded from the Internet on Mar. 1, 2012.

Infant Scale—listed on Internet as tianling\$413163126.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.  
 Infant Scale—listed on Internet as Electronic\_baby\_scale.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.  
 Infant Scale—listed on Internet as baby-weighing-scale.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.

\* cited by examiner

*Primary Examiner* — Antoine D Davis

(57) **CLAIM**

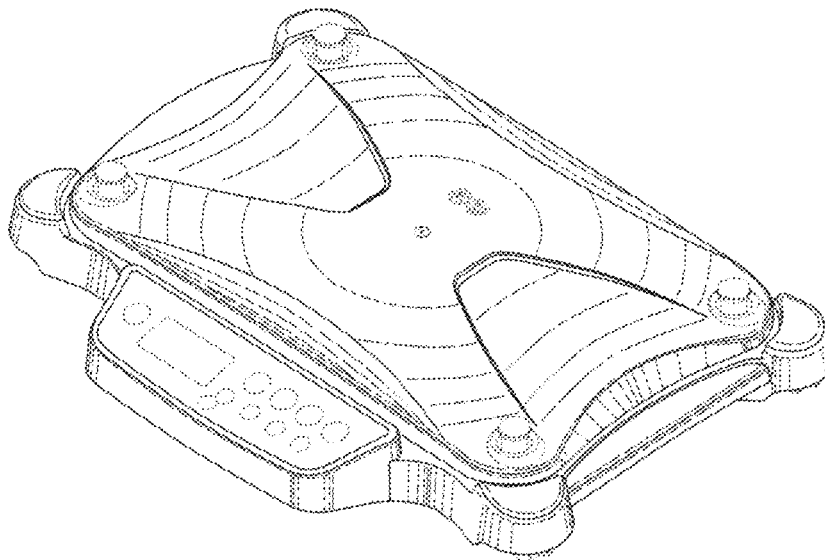
The ornamental design for an infant weighing scale, as shown and described.

**DESCRIPTION**

FIG. 1 is a front view of an infant weighing scale according to our new design;  
 FIG. 2 is a back view of the infant weighing scale shown in FIG. 1;  
 FIG. 3 is a top view of the infant weighing scale shown in FIG. 1;  
 FIG. 4 is a bottom view of the infant weighing scale shown in FIG. 1;  
 FIG. 5 is a left side view of the infant weighing scale shown in FIG. 1;  
 FIG. 6 is a right side view of the infant weighing scale shown in FIG. 1; and,  
 FIG. 7 is a perspective view of the infant weighing scale shown in FIG. 1.

The claimed design is shown in relatively bold lines. The broken lines are for the purpose of illustrating portions of the weighing scale display and form no part of the claimed design.

**1 Claim, 6 Drawing Sheets**





US00D674297S

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

(10) **Patent No.:** **US D674,297 S**

(45) **Date of Patent:** **\*\* Jan. 15, 2013**

(54) **INFANT WEIGHING SCALE**

(75) Inventors: **Ram Hillel**, Yuvalim (IL); **Offer Shalev**, Misgav (IL)

(73) Assignee: **Shekel Scales Co. (2008) Ltd.**, Kibbutz Beit-Keshet (IL)

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

(21) Appl. No.: **29/409,786**

(22) Filed: **Dec. 29, 2011**

(51) **LOC (9) Cl.** ..... **10-04**

(52) **U.S. Cl.** ..... **D10/94**

(58) **Field of Classification Search** ..... D10/88-91,  
D10/94; 177/25.13-25.18, 177-182, 211-214,  
177/210 R, 210 C, 210 GM, 210 FP, 210 PP,  
177/210 EM, 148, 236-245, DIG. 3, 126,  
177/262

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

D314,716 S *	2/1991	Busse	.....	D10/91
D614,518 S *	4/2010	Li et al.	.....	D10/91
7,893,367 B2 *	2/2011	Gerster	.....	177/126
8,153,912 B2 *	4/2012	Gerster et al.	.....	177/126

**OTHER PUBLICATIONS**

Infant Scale—listed on Internet as Baby\_Scale.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.  
 Infant Scale—listed on Internet as webbaby2010.gif—date is unknown—downloaded from the Internet on Mar. 1, 2012.  
 Infant Scale—listed on Internet as Baby-Scale-ATZ-A10-.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.  
 Infant Scale—listed on Internet as Baby-Scale.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.

Infant Scale—listed on Internet as Shekel\_Baby\_Scal\_Model\_T15P.gif—date is unknown—downloaded from the Internet on Mar. 1, 2012.

Infant Scale—listed on Internet as tianling\$413163126.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.

Infant Scale—listed on Internet as Electronic\_baby\_scale.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.

Infant Scale—listed on Internet as baby-weighing-scale.jpg—date is unknown—downloaded from the Internet on Mar. 1, 2012.

\* cited by examiner

*Primary Examiner* — Antoine D Davis

(57) **CLAIM**

The ornamental design for an infant weighing scale, as shown and described.

**DESCRIPTION**

FIG. 1 is a front view of an infant weighing scale according to our new design;

FIG. 2 is a back view of the infant weighing scale shown in FIG. 1;

FIG. 3 is a top view of the infant weighing scale shown in FIG. 1;

FIG. 4 is a bottom view of the infant weighing scale shown in FIG. 1;

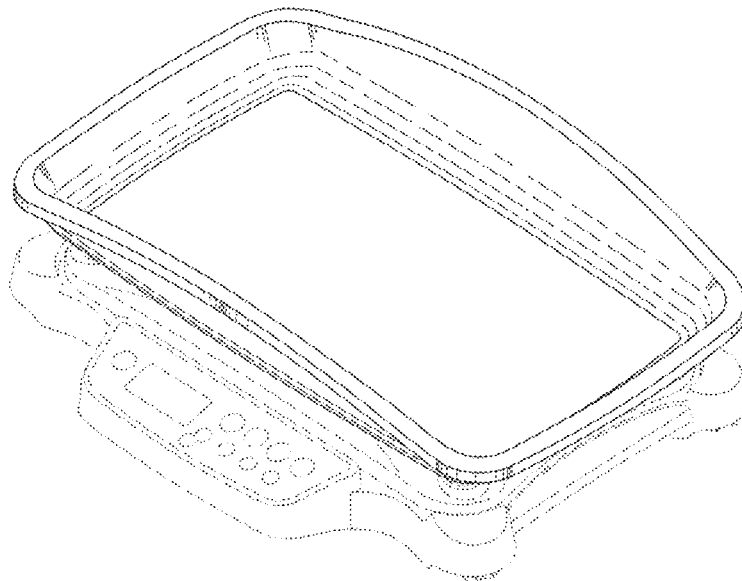
FIG. 5 is a left side view of the infant weighing scale shown in FIG. 1;

FIG. 6 is a right side view of the infant weighing scale shown in FIG. 1; and,

FIG. 7 is a perspective view of the infant weighing scale shown in FIG. 1.

The claimed design is shown in relatively bold lines. The broken lines are for the purpose of illustrating portions of the weighing scale display and form no part of the claimed design.

**1 Claim, 6 Drawing Sheets**





US009766113B2

(12) **United States Patent**  
**Trakhimovich**

(10) **Patent No.:** **US 9,766,113 B2**  
(45) **Date of Patent:** **Sep. 19, 2017**

(54) **LOAD CELL DEVICE HAVING A FLEXURAL ARRANGEMENT**

(71) Applicant: **Shekel Scales Co. (2008) Ltd.**, Kibbutz Beit-Keshet (IL)

(72) Inventor: **Michael Trakhimovich**, Gan Ner (IL)

(73) Assignee: **Shekel Scales Co. (2008) Ltd.**, Kibbutz Beit-Keshet (IL)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 73 days.

(21) Appl. No.: **14/398,467**

(22) PCT Filed: **May 2, 2013**

(86) PCT No.: **PCT/IB2013/000821**

§ 371 (c)(1),  
(2) Date: **Nov. 2, 2014**

(87) PCT Pub. No.: **WO2013/164675**

PCT Pub. Date: **Nov. 7, 2013**

(65) **Prior Publication Data**

US 2015/0107913 A1 Apr. 23, 2015

(30) **Foreign Application Priority Data**

May 2, 2012 (GB) ..... 1207656.8

(51) **Int. Cl.**  
**G01G 3/14** (2006.01)  
**G01G 23/06** (2006.01)  
**G01G 21/22** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **G01G 3/1402** (2013.01); **G01G 3/1412** (2013.01); **G01G 21/22** (2013.01); **G01G 23/06** (2013.01)

(58) **Field of Classification Search**  
CPC .... G01G 3/1402; G01G 3/1412; G01G 21/22; G01G 23/06

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,107,985 A \* 8/1978 Sommer ..... G01G 3/1412 177/211  
4,332,174 A \* 6/1982 Suzuki ..... G01G 3/1404 177/211

(Continued)

FOREIGN PATENT DOCUMENTS

FR 2660433 A 10/1991  
GB 1207656.8 5/2012

(Continued)

OTHER PUBLICATIONS

International Search Report for PCT/IB2013/000821, search report mailed Sep. 3, 2013.

(Continued)

*Primary Examiner* — Natalie Huls

(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A weighing scale and a load cell assembly therefor, the weighing scale including: (a) a weighing platform; (b) a base; and (c) a load cell arrangement including: (i) a load cell body, disposed below the platform and above the base, the body secured to the platform at a first position along a length of the body, and secured to the base at a second position along the length, the load cell body having a first cutout window transversely disposed through the body, the window adapted such that a downward force exerted on a top face of the weighing platform distorts the window to form a distorted window; and (ii) at least one strain-sensing gage, mounted on at least a first surface of the load cell body, the strain-sensing gage adapted to measure a strain in the first surface; and (d) an at least a one-dimensional flexure arrangement having at least a second cutout window transversely disposed through the body, the second cutout win-

(Continued)

