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January 19, 2020

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APPLICATION NUMBER: 62/849,412

FILING DATE: *May 17, 2019*

RELATED PCT APPLICATION NUMBER: *PCT/US19/68209*

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS *US62/849,412*



Certified by

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for Intellectual Property
and Director of the United States
Patent and Trademark Office

Patent Application of
Neal T Saiki
for
Regenerative Braking Energy Dissipater

Background - Field of Invention

This invention relates to a small electric vehicle with regenerative braking. Examples of a small electric vehicle include electric bicycles, electric scooters and electric skateboards. These electric vehicles have a motor and battery that are used for propulsion and regenerative braking. Regenerative braking is where the motor is used to generate energy which causes the vehicle to decelerate in a manner similar to braking. The energy generated by the motor is used to charge the battery. Sometimes the battery cannot accept some or all of the energy. This may be because there is too much energy at once or maybe the battery is already fully charged.

One common solution to this problem is to simply not allow regenerative braking to happen if the battery cannot accept the energy. This is not a good solution because it is important to have consistent braking. It is possible to use a mechanical brake instead of regenerative braking, but making this change isn't easy for the rider to do. It is possible to have a mechanism that automatically switches over to the mechanical braking if the regenerative braking is not available, but this is a lot of added complexity for a small vehicle. Electric cars have this feature, but it is too complex and expensive for a small electric vehicle.

The excess energy that is not used to charge the battery can be dissipated as heat through one or more resistors. The amount of energy generated by an electric bicycle during braking is often too much for the resistors to handle without damaging them due to over temperature operation. A remedy to this is to attach a heat sink to the resistors. .The heat sink dissipates heat by convection to the air.

Background - Discussion of Prior Art

Drawing Figures

The disclosed embodiments have other advantages and features which will be more readily apparent from the detailed description, the appended claims, and the accompanying figures (or drawings). A brief introduction of the figures is below.

FIG. 1,

FIG. 2,

List of Reference Numerals in Drawings:

- 1.
- 2.

Description – First Embodiment

One embodiment of the current invention is illustrated in perspective in Figure X.

Various methods for attaching to the heat sink could be utilized such as: fasteners, glue, caulk, foam, etc. Silicone caulk is a good choice and provides thermal and mechanical support.

Operation

The

Additional Embodiments

An additional embodiment of the.

In another embodiment, the resistors could be mounted in between the printed circuit board and the heat sink. This would provide a more direct thermal path from the resistors to the heat sink.

Conclusion, Ramifications and Scope

Thus the reader will see the

There are further applications of the small electric vehicle regenerative braking energy dissipater to various types of small vehicles such as: motorcycles, tricycles (three wheeled vehicles), scooters, mopeds, etc.

While various embodiments in accordance with the present invention have been described, it is understood that the invention is not limited thereto, and is susceptible to numerous changes and modifications as known to those skilled in the art. For example, Therefore, this invention is not limited to the details shown and described herein, and includes all such changes and modifications as are encompassed by the scope of the appended claims.

Block Outlined Description of Various Embodiments:

- 1) A regenerative braking energy dissipater comprising:
 - a) an aluminum finned heat sink,
 - b) a printed circuit board mounted to the heat sink,
 - c) surface mount resistors mounted to said printed circuit board,
 - d) whereby the regenerative braking energy dissipater is compact and low profile and therefore can be easily mounted on a small electric vehicle such as an electric bicycle or electric scooter.

- 2) The regenerative braking energy dissipater in block 1 further comprising:
 - a) a battery case with an external surface where the heat sink, printed circuit board and the resistors are mounted,
 - b) whereby making a system that is integrated into said battery case.

- 3) The regenerative braking energy dissipater in block 1:
 - a) where said surface mount resistors are thin or thick film resistors.

- 4) A regenerative braking energy dissipater comprising:
 - a) a battery case with an external surface ,
 - b) an aluminum finned heat sink,
 - c) a printed circuit board mounted to the heat sink,
 - d) surface mount resistors mounted to said printed circuit board,
 - e) where the heat sink, printed circuit board and the resistors are mounted to the external surface of said battery case,
 - f) whereby making a system that is integrated into said battery case.

- 5) The regenerative braking energy dissipater in block 4:
 - a) where said surface mount resistors are thin or thick film resistors.

Electronic Acknowledgement Receipt

EFS ID:	36045973
Application Number:	62849412
International Application Number:	
Confirmation Number:	3997
Title of Invention:	Regenerative Braking Energy Dissipater
First Named Inventor/Applicant Name:	Neal Tate Saiki
Correspondence Address:	Neal Saiki - 2099 El Rancho Drive - Santa Cruz CA 95060 US 8312472015 neal@smartpidity.com
Filer:	Neal Saiki
Filer Authorized By:	
Attorney Docket Number:	
Receipt Date:	17-MAY-2019
Filing Date:	
Time Stamp:	15:10:51
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$70

RAM confirmation Number	052019INTEFSW15120000
Deposit Account	
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Provisional Cover Sheet (SB16)	PPA_Cover_Sheet_2019_05_17.pdf	1477193 1faab1e7c798cc479227da107ee7e9e684a556ba	no	3

Warnings:

Information:

2	Certification of Micro Entity (Gross Income Basis)	sb0015a_2019_05_17.pdf	119756 55bc52101c04e7bdf644098a146c7f45cb6b82ae	no	2
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Warnings:

Information:

3	Specification	Patent_PPA_2018_12_26_Regenerative_Braking_Energy_Dissipater.pdf	278019 407c7bf3ce1129a33052acc0202ef16ebd1f9f42	no	3
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Warnings:

Information:

4	Drawings-other than black and white line drawings	B1_v5_p1.PDF	441323 4fb328ec908aa7f45ecc89e5de221a7e0927885f	no	1
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Warnings:

Information:

5	Drawings-other than black and white line drawings	B1_v5_p2.PDF	390669 fb2cbc2d29554565cc853600374a69885afcbcb	no	1
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Warnings:

Information:

6	Drawings-other than black and white line drawings	B1_v5_p3.PDF	85400	no	1
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Warnings:

Information:

7	Fee Worksheet (SB06)	fee-info.pdf	29152	no	2
			c981ec5d453fbcc1f61bc2063564df74780c0ebb		

Warnings:

Information:

Total Files Size (in bytes):	2821512
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National Stage of an International Application under 35 U.S.C. 371

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Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

Inventor(s)

Inventor 1

Remove

Given Name

Middle Name

Family Name

City

State

Country j

Neal

Saiki

Santa Cruz

CA

US

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

Add

Title of Invention

Regenerative Braking Energy Dissipater

Attorney Docket Number (if applicable)

Correspondence Address

Direct all correspondence to (select one):

The address corresponding to Customer Number

Firm or Individual Name

Firm or Individual Name 1

Neal Saiki

Firm or Individual Name 2

Mailing Address of Applicant:

Address 1

2099 El Rancho Drive

Address 2

City

Santa Cruz

State/Province

CA

Postal Code

95060

Country j

US

Phone

(831)247-2015

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

No.

Yes, the invention was made by an agency of the United States Government. The U.S. Government agency name is:

Yes, the invention was under a contract with an agency of the United States Government. The name of the U.S. Government agency and Government contract number are:

Doc Code: **TR.PROV**

Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (11-08)

Approved for use through 05/31/2015. OMB 0651-0032

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Entity Status

Applicant asserts small entity status under 37 CFR 1.27 or applicant certifies micro entity status under 37 CFR 1.29

- Applicant asserts small entity status under 37 CFR 1.27
- Applicant certifies micro entity status under 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
- No

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Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	Neal Saiki/		Date (YYYY-MM-DD)	2019-05-17	
First Name	Neal	Last Name	Saiki	Registration Number (If appropriate)	

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

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The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

SCORE Placeholder Sheet for IFW Content

Application Number: 62849412

Document Date: 05/17/2019

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via DAV or via the SCORE web page.
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#	Name	QTY
1	B1 Case Bot v5	1
2	B1 Case Top v5	1
3	B1 Cell Holder L v0	1
4	B1 Mount WB v6	1
5	B1 Cell Holder R v0	1
6	cell 18650	28
7	SHCS M4x10	4
8	Grommet p375ID p5Hole	1
9	SHCS Flat M5x12	2
10	B1 Foam 1p6 x 6p4 x 120 v0	4
11	BMS Daly WP CP 20A	1
12	Controller ASI BAC Ne 500 48 35	1
13	Plug 5p5x2p1 Panel Mt all metal	1
14	B1 Heater PCB v0	1
15	Resistor Thick Film 14x8xp9	9
16	B1 Heater Sink v0	1
17	SHCS Button Flanged M3x05	2
18	B1 Foam Tape p8 x 6p4 x 100 v0	2

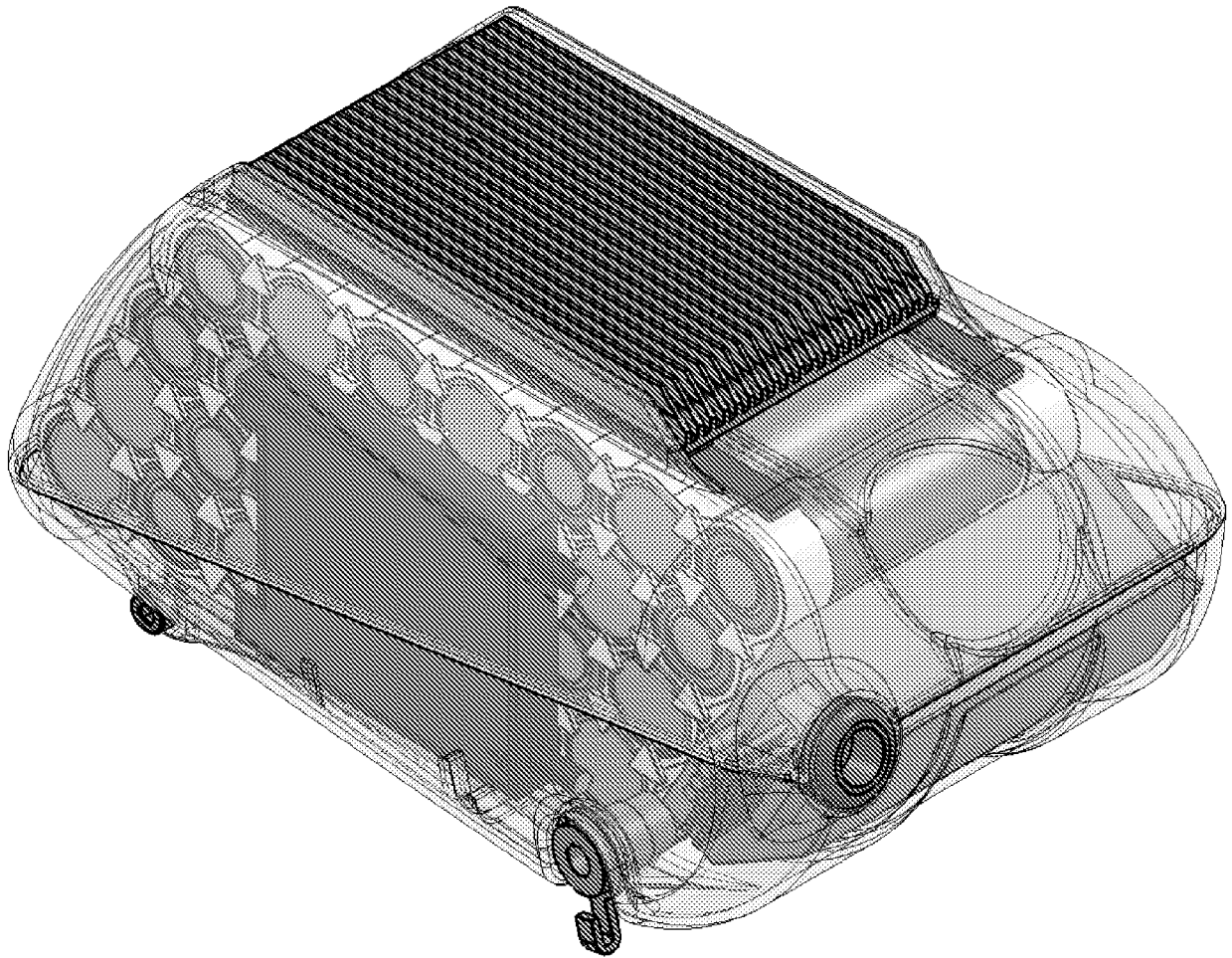


Figure 1

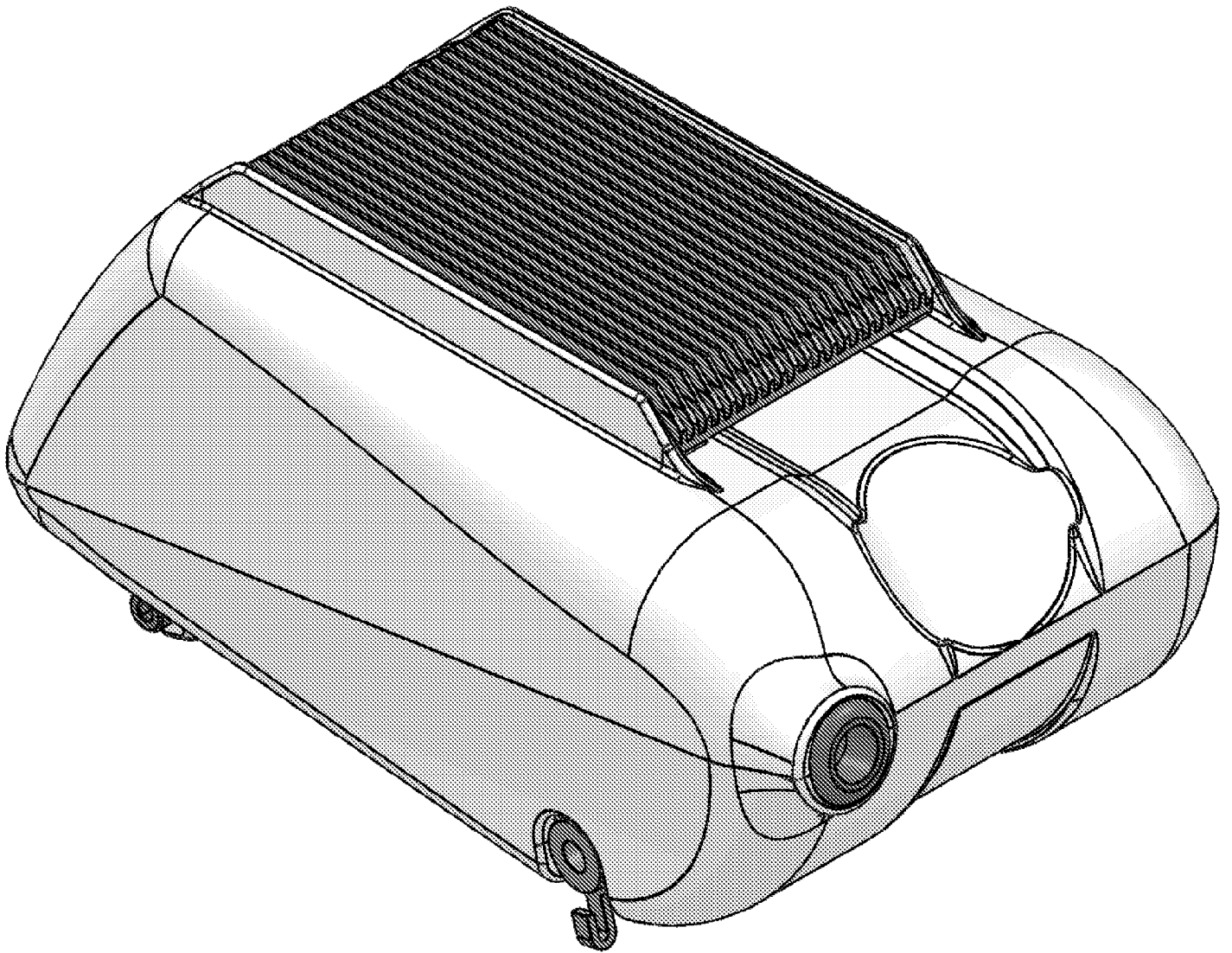


Figure 2

#	SW-File Name(File Name)	QTY.
1	B1 Heater PCB v0	1
2	Resistor Thick Film 14x8xp9	9
3	B1 Heater Sink v0	1
4	SHCS Button Flanged M3x05	2
5	B1 Foam Tape p8 x 6p4 x 100 v0	2

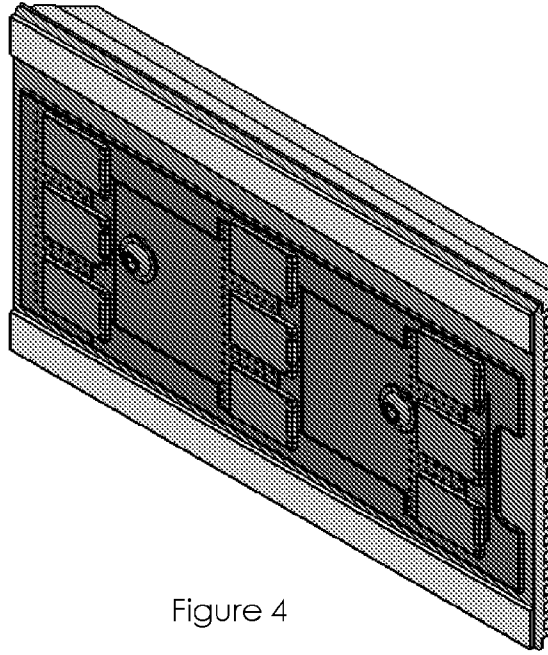


Figure 4

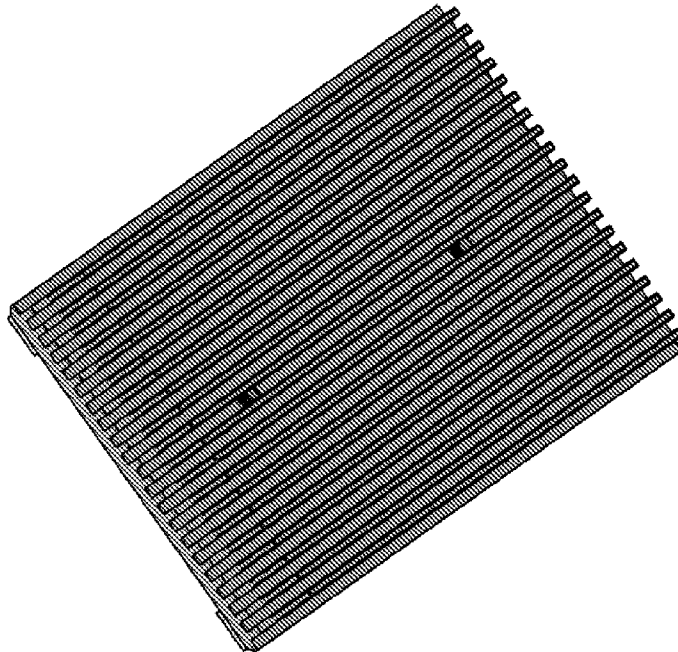


Figure 5