United States of America

To Promote the Progress of Science and Useful Arts

The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Andrei Iancu

DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

1/12

US010547179B2

(12) **United States Patent**
Cao

(10) **Patent No.: US 10,547,179 B2**
(45) **Date of Patent: Jan. 28, 2020**

(54) **HIGH EFFICIENCY ELECTRIC POWER GENERATION AND CHARGING SYSTEM**

(71) Applicant: **Calvin Cuong Cao**, Costa Mesa, CA (US)

(72) Inventor: **Calvin Cuong Cao**, Costa Mesa, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 117 days.

(21) Appl. No.: **15/943,409**

(22) Filed: **Apr. 2, 2018**

(65) **Prior Publication Data**

US 2018/0226805 A1 Aug. 9, 2018

Related U.S. Application Data

(60) Provisional application No. 62/583,335, filed on Nov. 8, 2017, provisional application No. 62/481,626, filed on Apr. 4, 2017.

(51) **Int. Cl.**

H02J 3/46	(2006.01)
H02K 7/02	(2006.01)
H02J 3/38	(2006.01)
H02J 3/32	(2006.01)
H02J 7/00	(2006.01)
H02M 7/5387	(2007.01)
H02P 9/48	(2006.01)
H02J 3/00	(2006.01)

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

CPC ***H02J 3/46*** (2013.01); ***H02J 3/005*** (2013.01); ***H02J 3/32*** (2013.01); ***H02J 3/382*** (2013.01); ***H02J 7/008*** (2013.01); ***H02K 7/025*** (2013.01); ***H02M 7/5387*** (2013.01); ***H02P 9/48*** (2013.01); *Y02E 60/16* (2013.01)

(58) **Field of Classification Search**

CPC H02J 3/00; H02J 3/005; H02J 3/32; H02J 3/38; H02J 3/46; H02J 3/382; H92J 7/00; H92J 7/008; H92J 7/5387; H02P 9/48

USPC 307/57, 82, 80, 43, 38, 66, 64, 9.1, 10.1

See application file for complete search history.

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OTHER PUBLICATIONS

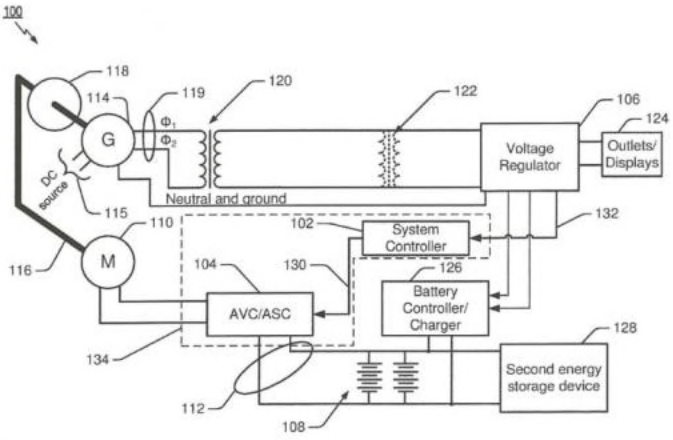
International Search Report & Written Opinion for counterpart application No. PCT/US2018/025948 dated Jun. 20, 2018; 5 pages.

Primary Examiner — Rexford N Barnie
Assistant Examiner — Jagdeep S Dhillon
(74) *Attorney, Agent, or Firm* — Loza & Loza, LLP; Heidi L. Eisenhut

(57) **ABSTRACT**

Disclosed is a virtually renewable electric power-generating system configured to provide an efficient means for generating electricity for charging an electrical energy storage source such as batteries using the same energy storage source to power an electro-mechanical system for generating electricity. Part of the output of the electro-mechanical system for generating electricity is fed back to the energy storage source to recharge the storage source, as well as provide energy to charge a second energy storage system.

9 Claims, 4 Drawing Sheets



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPÄISCHES PATENT | EUROPEAN PATENT BREVET EUROPÉEN

Hiermit wird bescheinigt, dass für die in der Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

It is hereby certified that a European patent has been granted in respect of the invention described in the patent specification for the Contracting States designated in the specification.

Il est certifié par la présente qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet, pour les États contractants désignés dans le fascicule.

Europäisches Patent Nr European patent No. Brevet européen n°	Tag der Bekanntmachung des Hinweises auf die Erteilung des europäischen Patents Date of publication of the mention of the grant of the European patent Date de la publication de la mention de la délivrance du brevet européen
EP3607627	**07.06.2023**

HIGH EFFICIENCY ELECTRIC POWER GENERATION AND CHARGING SYSTEM

Patentinhaber | Proprietor(s) of the patent | Titulaire(s) du brevet

Cao, Calvin Cuong
600 Anton Boulevard-11th Floor
Costa Mesa, CA 92626
US

António Campinos

Präsident des Europäischen Patentamts | President of the European Patent Office | Président de l'Office européen des brevets

München, den | Munich, | Munich, le **07.06.2023**

URKUNDE | CERTIFICATE | CERTIFICAT

EPA/EPO/OEB 2031 10.22

Innovation, Sciences et Développement économique Canada
Office de la propriété intellectuelle du Canada

Innovation, Science and Economic Development Canada
Canadian Intellectual Property Office

Brevet canadien / Canadian Patent

3,058,808
Numéro de brevet
Patent number

Le commissaire aux brevets a accordé un brevet pour l'invention décrite dans le mémoire descriptif portant le numéro de brevet susmentionné. Le mémoire descriptif est accessible dans la Base de données sur les brevets canadiens sur le site Web de l'Office de la propriété intellectuelle du Canada.

The Commissioner of Patents has granted a patent for the invention described in the specification under the above-noted patent number. The specification is accessible in the Canadian Patents Database on the website of the Canadian Intellectual Property Office.

Commissaire aux brevets
Commissioner of Patents

PATENT OFFICE • BUREAU DES BREVETS • CANADA

Titre de l'invention / Title of invention
SYSTEME DE PRODUCTION ET DE CHARGE A HAUT RENDEMENT DE PUISSANCE ELECTRIQUE

HIGH EFFICIENCY ELECTRIC POWER GENERATION AND CHARGING SYSTEM

Breveté(s) / Patentee(s)
CAO, CALVIN CUONG

Inventeur(s) / Inventor(s)
CAO, CALVIN CUONG

Date de l'octroi et de la délivrance du brevet / Patent grant and issue date
2024-03-05

Date de dépôt de la demande / Filing date of the application
2018-04-03

Date d'accessibilité au public / Date application open to public inspection
2018-10-11

Canada

特　許　証
(CERTIFICATE OF PATENT)

特許第７１４２９４４号
(PATENT NUMBER)

発明の名称
(TITLE OF THE INVENTION)　高効率発電・充電システム

特許権者
(PATENTEE)　アメリカ合衆国、カリフォルニア州　９２６２６、コスタ　メサ、アントン　ブールヴァード　６００、１１　フロア
国籍・地域　アメリカ合衆国
カオ、カルヴィン　クウォング

発明者
(INVENTOR)　**カオ、カルヴィン　クウォング**

出願番号
(APPLICATION NUMBER)　特願２０１９－５５０６９７

出願日
(FILING DATE)　平成３０年　４月　３日(April 3, 2018)

登録日
(REGISTRATION DATE)　令和　４年　９月１６日(September 16, 2022)

この発明は、特許するものと確定し、特許原簿に登録されたことを証する。
(THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE JAPAN PATENT OFFICE.)

令和　４年　９月１６日(September 16, 2022)

特許庁長官
(COMMISSIONER, JAPAN PATENT OFFICE)

濱野幸一

특허증

CERTIFICATE OF PATENT

특 허 Patent Number **제 10-2546831 호**

출원번호 Application Number **제 10-2019-7031179 호**

출원일 Filing Date **2019년 10월 22일**

등록일 Registration Date **2023년 06월 19일**

발명의 명칭 Title of the Invention

고효율 전기 발전 및 충전 시스템

특허권자 Patentee

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위의 발명은 「특허법」에 따라 특허원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.

특허청
Korean Intellectual Property Office

2023년 06월 19일

QR코드로 현재기준 등록사항을 확인하세요

특허청장
COMMISSIONER,
KOREAN INTELLECTUAL PROPERTY OFFICE

이 인 실

证书号第7054343号

发明专利证书

发明名称：高效电力发电和充电系统

发 明 人：曹·卡尔文·强

专 利 号：ZL 2018 8 0007708.6

专利申请日：2018年04月03日

专利权人：曹·卡尔文·强

地 址：美国加利福尼亚州

授权公告日：2024年05月31日　　授权公告号：CN 110447155 B

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国家知识产权局
2024年05月31日

其他事项参见续页

Australian Government

IP Australia

CERTIFICATE OF GRANT

STANDARD PATENT

Patent number: 2018249834

The Commissioner of Patents has granted the above patent on 12 May 2022, and certifies that the below particulars have been registered in the Register of Patents.

Name and address of patentee(s):

Calvin Cuong Cao of 600 Anton Boulevard-11th Floor Costa Mesa CA 92626 United States of America

Title of invention:

High efficiency electric power generation and charging system

Name of inventor(s):

Cao, Calvin Cuong

Term of Patent:

Twenty years from 3 April 2018

Priority details:

Number	*Date*	*Filed with*
62/583,335	8 November 2017	US
62/481,626	4 April 2017	US
15/943,409	2 April 2018	US

COMMONWEALTH OF AUSTRALIA AUSTRALIA PATENT OFFICE

Dated this 12th day of May 2022

Commissioner of Patents

PATENTS ACT 1990

The Australian Patents Register is the official record and should be referred to for the full details pertaining to this IP Right.

REPUBLIC OF SINGAPORE
THE PATENTS ACT 1994
CERTIFICATE ISSUED UNDER SECTION 35

I HEREBY CERTIFY that under the provisions of the Patents Act, a patent has been granted in respect of an invention having the following particulars:

TITLE	:	HIGH EFFICIENCY ELECTRIC POWER GENERATION AND CHARGING SYSTEM
APPLICATION NUMBER / PATENT NUMBER	:	11201909291R
DATE OF FILING	:	03 APRIL 2018
PRIORITY DATA	:	08 NOVEMBER 2017 - PATENT APPLICATION NO. 62/583,335 (UNITED STATES OF AMERICA) 04 APRIL 2017 - PATENT APPLICATION NO. 62/481,626 (UNITED STATES OF AMERICA) 02 APRIL 2018 - PATENT APPLICATION NO. 15/943,409 (UNITED STATES OF AMERICA)
NAME OF INVENTOR (S)	:	CAO, CALVIN, CUONG

BỘ KHOA HỌC VÀ CÔNG NGHỆ
CỤC SỞ HỮU TRÍ TUỆ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

BẰNG ĐỘC QUYỀN
SÁNG CHẾ
Số: 38491

Tên sáng chế: HỆ THỐNG SẢN XUẤT VÀ TÍCH TRỮ NĂNG LƯỢNG ĐIỆN VÀ PHƯƠNG PHÁP SẢN XUẤT VÀ TÍCH TRỮ NĂNG LƯỢNG ĐIỆN

Chủ Bằng độc quyền: CAO, Calvin, Cuong (US)
600 Anton Boulevard 11th Floor Costa Mesa, CA 92626, United States of America

Tác giả: CAO, Calvin, Cuong (US)

Số đơn: 1-2019-05257

Ngày nộp đơn: 03/04/2018

Số điểm yêu cầu bảo hộ: 11 **Số trang mô tả:** 19

Cấp theo **Quyết định** số: 121821/QĐ-SHTT, **ngày**: 22/12/2023

Có hiệu lực từ ngày cấp đến hết 20 năm tính từ ngày nộp đơn (Hiệu lực bảo hộ cần duy trì hàng năm).

KT. CỤC TRƯỞNG
PHÓ CỤC TRƯỞNG

CỤC SỞ HỮU TRÍ TUỆ

Lê Huy Anh

VN 38491

REPUBLIK INDONESIA
KEMENTERIAN HUKUM DAN HAK ASASI MANUSIA

SERTIFIKAT PATEN

Menteri Hukum dan Hak Asasi Manusia atas nama Negara Republik Indonesia berdasarkan Undang-Undang Nomor 13 Tahun 2016 tentang Paten, memberikan hak atas Paten kepada:

Nama dan Alamat Pemegang Paten	: CAO, Calvin, Cuong 600 Anton Boulevard-11th Floor, Costa Mesa, CA 92626 (US)
Untuk Invensi dengan Judul	: SISTEM PENGISIAN DAYA DAN PEMBANGKIT TENAGA LISTRIK BERKEMAMPUAN TINGGI
Inventor	: CAO, Calvin, Cuong
Tanggal Penerimaan	: 03 April 2018
Nomor Paten	: IDP000087825
Tanggal Pemberian	: 31 Mei 2023

Pelindungan Paten untuk invensi tersebut diberikan untuk selama 20 tahun terhitung sejak Tanggal Penerimaan (Pasal 22 Undang-Undang Nomor 13 Tahun 2016 tentang Paten).

Sertifikat Paten ini dilampiri dengan deskripsi, klaim, abstrak dan gambar (jika ada) dari invensi yang tidak terpisahkan dari sertifikat ini.

a.n MENTERI HUKUM DAN HAK ASASI MANUSIA
DIREKTUR JENDERAL KEKAYAAN INTELEKTUAL
u.b.
Direktur Paten, Desain Tata Letak Sirkuit Terpadu dan Rahasia Dagang

DIREKTORAT JENDERAL KEKAYAAN INTELEKTUAL

Drs. YASMON, M.L.S.
NIP. 196805201994031002

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Laman Sesawang : www.myipo.gov.my

APPLICATION NO.	: PI2019005818
GRANT NO.	: MY-201725-A
OWNER	: CAO, CALVIN, CUONG
DATE OF GRANT AND PUBLICATION	: 14 MARCH 2024
APPLICANT'S/AGENT'S REF.	: TLY/IPD/60317/19

NOTICE OF GRANT

The purpose of this notice is to advise you that a patent/utility innovation has been granted on the above application.

Please find enclosed a certificate of grant with a copy of the patent/utility innovation together with a copy of the Examiner's final report (if not previously provided) in accordance with Section 31 (2)(a) of the Patents Act.

Copies of the Patent/utility innovation were made available to the public on the date of grant. A reference to the grant will be published in the Gazette as soon as possible.

Your attention is drawn to the need to pay annual renewal fees in order to keep the patent/utility innovation in force (see Section 35(2) and (3) of the Patents Act and Schedule 1 of the Regulations).

Date : 19 APRIL 2024

AMIRUDDIN MOHD ZAIN
For Registrar of Patents
✉ **amirzain@myipo.gov.my**
☎ **03-74963294**

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C/O LEVEL 6, MENARA 1 DUTAMAS
SOLARIS DUTAMAS
NO. 1, JALAN DUTAMAS 1
50480 KUALA LUMPUR
MALAYSIA

LETTERS PATENT
INVENTION

PATENT NO. 1/2019/502249

Having complied with the provisions of Republic Act No. 8293 and its regulations, this Office certifies that this Patent with the following particulars was granted on **6 February 2023** with a term until **3 April 2038**, unless otherwise earlier cancelled, lapsed, or forfeited.

This patent grants to the holder the right to restrain, prohibit any unauthorized person or entity from making, using, offering for sale, selling or importing a product (if a patented product) and importing any product obtained directly or indirectly from such process (if a patented process).

Patentee:
CAO, Calvin Cuong (Costa Mesa, California, US)

Title of the Invention:
HIGH EFFICIENCY ELECTRIC POWER GENERATION AND CHARGING SYSTEM

Inventors:
CAO, Calvin, Cuong (Costa Mesa, California, US)

Publication Date:
11 October 2018

ANN N. EDILLON, M.D., J.D.
Director, Bureau of Patents

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INTELLECTUAL PROPERTY OFFICE OF THE PHILIPPINES
Bureau of Patents

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PEACE INDEPENDENCE DEMOCRACY UNITY PROSPERITY

MINISTRY OF INDUSTRY AND COMMERCE
DEPARTMENT OF INTELLECTUAL PROPERTY

ISSUES

CERTIFICATE OF GRANT OF PATENT

№ : 681

TO : **CAO, Calvin, Cuong**

ADDRESS : **600 Anton Boulevard-11th Floor Costa Mesa, CA 92626, U S A**

FILING № : **681**

FILING DATE : **27 September 2019** **PRIORITY DATE** : **15/943,409 02/04/2018 US; 62/481,626 04/04/2017 US; and 62/583,335 08/11/2017 US**

TITLE OF INVENTION : **HIGH EFFICIENCY ELECTRIC POWER GENERATION AND CHARGING SYSTEM**

INVENTOR(S) : **CAO, Calvin, Cuong**

TERM OF PATENT : **20 YEAR FROM THE FILING DATE**

In order to maintain the term of protection, the patent owner shall pay anual fees in advance.

THIS CERTIFICATE ENTERED INTO THE NATIONAL REGISTRY OF PATENT AND HAS LEGAL FORCE IN TERRITORY OF LAO PDR.

VIENTIANE CAPITAL, **20 June 2022**
DEPARTMENT OF INTELLECTUAL PROPERTY

2022-7348

Santisouk PHOUNESAVATH
DIRECTOR GENERAL