In The United States Patent and Trademark Office

Int'l Appl. No.:	PCT/CN2017/093119	Int'l Pub. No.:	
Applicant(s):	Nine Starts Group (U.S.A.) Inc.; Fujian Nashida Electronic Incorporated Company		
Int'l Filing Date:	07/17/2017	Docket Number:	USP10302A-NSG

Title: Induction Trash Can Circuit Standby Power-saving Method

Date: November 15, 2018

PRELIMINARY AMENDMENT

Commissioner for Patents,
P.O. Box 1450,
Alexandria, VA 22313-1450

Sir:

Kindly amend the above application as follows.

CLAIM AMENDMENTS

Claims 1-5 (cancelled).

Claim 6 (new): A power-saving method for induction trash can circuit, comprising the steps of:

controlling the active infrared sensor to emit an infrared pulse signal to the induction area by a microcontroller in a standby state;

setting the microcontroller into a sleep state if no reflection output signal is received from the active infrared sensor; or

remaining the microcontroller in the working state if a reflection output signal is received from the active infrared sensor and controlling the driving circuit to drive the motor to rotate forward to open the lid of the induction trash can, delaying for a few seconds after the motor has driven the lid to open, controlling the driving circuit to drive the motor to rotate backward to close the lid, and setting the microcontroller into the sleep state after the lid is closed; and

waking up the microcontroller by the watchdog timer disposed therein after a preset time, so as to have the microcontroller reenter the working state and repeat the above steps under the standby state.

Claim 7 (new): The power-saving method, as recited in claim 6, further comprising the steps of:

cutting off the power supply of the active infrared sensor when the microcontroller enters the sleep state; and

restoring the power supply of the active infrared sensor, delaying for a preset threshold time for the active infrared sensor to enter a stable working state, controlling the active infrared sensor to emit an infrared pulse signal to the induction area when the microcontroller is in a standby state.

Claim 8 (new): The power-saving method, as recited in claim 6, wherein the preset time is between 100ms and 500ms.

Claim 9 (new): The power-saving method, as recited in claim 7, wherein the preset time is between 100ms and 500ms.

Claim 10 (new): The power-saving method, as recited in claim 7, wherein the preset threshold time is between 2ms and 50ms.

Claim 11 (new): The power-saving method, as recited in claim 9, wherein the preset threshold time is between 2ms and 50ms.

Claim 12 (new): The power-saving method, as recited in claim 6, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 13 (new): The power-saving method, as recited in claim 7, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 14 (new): The power-saving method, as recited in claim 8, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 15 (new): The power-saving method, as recited in claim 9, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 16 (new): The power-saving method, as recited in claim 10, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 17 (new): The power-saving method, as recited in claim 11, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

REMARKS-General

1. The claims 1-5 are replaced by the newly drafted claims 6-17. No new matter has been included. All new claims 6-17 are submitted to be of sufficient clarity and detail to enable a person of average skill in the art to make and use the instant invention, so as to be pursuant to 35 U.S.C. §112.

2. Should the Examiner believe that anything further is needed in order to place the application in condition for allowance, he is requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

/Raymond Y. Chan/

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Raymond Y. Chan
Reg. Nr. 37,484

/Raymond Y. Chan/
(Signature)

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Induction Trash Can Circuit Standby Power-saving Method
First Named Inventor/Applicant Name:	Xin WANG
Filer:	Raymond Yat Chan/Michael Lee
Attorney Docket Number:	USP10302A-NSG

Filed as Small Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
BASIC NATIONAL STAGE FEE	2631	1	150	150
NATL STAGE SEARCH FEE - REPORT PROVIDED	2642	1	260	260
NATL STAGE EXAM FEE - ALL OTHER CASES	2633	1	380	380
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**790**

Electronic Acknowledgement Receipt	
EFS ID:	34772060
Application Number:	16315652
International Application Number:	PCT/CN2017/093119
Confirmation Number:	6872
Title of Invention:	Induction Trash Can Circuit Standby Power-saving Method
First Named Inventor/Applicant Name:	Xin WANG
Customer Number:	30265
Filer:	Raymond Yat Chan/Michael Lee
Filer Authorized By:	Raymond Yat Chan
Attorney Docket Number:	USP10302A-NSG
Receipt Date:	06-JAN-2019
Filing Date:	
Time Stamp:	21:32:25
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$790
RAM confirmation Number	010719INTEFSW21333500
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Authorized User	
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	Application Data Sheet	USP10302ADS.pdf	1503612 a1d257426081364dc2cdf869dc26c9a07eac5287	no	8
Warnings:					
Information:					
2	Transmittal Letter	USP10302pto1390.pdf	260652 36179204c3da348299363d1899d9a017686c1f66	no	4
Warnings:					
Information:					
3	Oath or Declaration filed	USP10302declaration.pdf	137832 331d461a026221282a75cdf9bb29fc95549f4350	no	2
Warnings:					
Information:					
4	Power of Attorney	USP10302POAinventor.pdf	169332 9aedba24471db0173496100ad0d90d651827e4f3	no	3
Warnings:					
Information:					
5	Power of Attorney	USP10302POAassignee.pdf	360277 25923e337a981e048dff2fc652492d0303a6f443	no	2
Warnings:					
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6	Documents submitted with 371 Applications	USP10302PCTCN2017093119Specification.pdf	1239797 fea401b0f6a419c0bf6facdb66011e51e0994181	no	14
Warnings:					
Information:					

7	Documents submitted with 371 Applications	USP10302PCTCN2017093119SearchReport.pdf	291090 88c212377943ee0a3b06b8379051eff7a6f137cd	no	6
Warnings:					
Information:					
8	Specification	USP10302specification.pdf	153931 47f1834d91eb53522f8392dc509f48a36fb77b9a	no	13
Warnings:					
Information:					
9	Claims	USP10302claims.pdf	52308 3173d1839f03a6b4f4a5bb5fa3318537d61f8788	no	2
Warnings:					
Information:					
10	Abstract	USP10302abstract.pdf	51640 629d3a75da73367744039f43dc5c6d8a2616e6cf	no	1
Warnings:					
Information:					
11	Drawings-only black and white line drawings	USP10302drawings.pdf	251456 129dc19459d9c207e50bb0df35bf2455475bca4a	no	3
Warnings:					
Information:					
12	Preliminary Amendment	USP10302PreAmdCover.pdf	113278 9d0098c2e034995b333bbf8f495a0d0e819447e0	no	1
Warnings:					
Information:					
13	Claims	USP10302PreAmdClaims.pdf	108204 749c0e84f6d4921238bd439b2f3b8bacf194ab15	no	3
Warnings:					
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14	Applicant Arguments/Remarks Made in an Amendment	USP10302PreAmdRemarks.pdf	115930 2773fa1dd82ad2d16ff54b532713fd4c772fb830	no	1
Warnings:					
Information:					
15	Fee Worksheet (SB06)	fee-info.pdf	35486 95f8218fe6301a2210c415b27fc62a7f30d47c10	no	2
Warnings:					
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		Total Files Size (in bytes):	4844825		

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<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USP10302A-NSG
	Application Number	
Title of Invention	Induction Trash Can Circuit Standby Power-saving Method	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Xin		WANG	

Residence Information (Select One) US Residency ● Non US Residency Active US Military Service

City	Fuzhou	Country of Residence [i]	CN

Mailing Address of Inventor:

Address 1	Floor1-3,Factory Building 3#,No.16 Builing of West
Address 2	Xincheng Road, Qingkou, Minhou,
City	Fuzhou, Fujian
State/Province	
Postal Code	350119
Country [i]	CN

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jiangqun		CHEN	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

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Mailing Address of Inventor:

Address 1	Floor1-3,Factory Building 3#,No.16 Builing of West
Address 2	Xincheng Road, Qingkou, Minhou,
City	Fuzhou, Fujian
State/Province	
Postal Code	350119
Country [i]	CN

Inventor 3 Remove

Legal Name

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	Application Number	
Title of Invention	Induction Trash Can Circuit Standby Power-saving Method	

Prefix	Given Name	Middle Name	Family Name	Suffix
	Zhou		LIN	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Fuzhou	Country of Residence [i]	CN

Mailing Address of Inventor:

Address 1	Floor1-3,Factory Building 3#,No.16 Builing of West		
Address 2	Xincheng Road, Qingkou, Minhou,		
City	Fuzhou, Fujian	**State/Province**	
Postal Code	350119	**Country** [i]	CN

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

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	30265		
Email Address	raymondchan@davidandraymond.com	Add Email	Remove Email

Application Information:

Title of the Invention	Induction Trash Can Circuit Standby Power-saving Method		
Attorney Docket Number	USP10302A-NSG	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	3	**Suggested Figure for Publication (if any)**	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

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Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	30265		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/CN2017/093119	2017-07-17

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
PCT/CN2017/093119	CN	2017-07-17	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201710223843.1	CN	2017-04-07	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USP10302A-NSG
	Application Number	
Title of Invention	Induction Trash Can Circuit Standby Power-saving Method	

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

Authorization to Permit Access:

Authorization to Permit Access to the Instant Application by the Participating Offices
If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USP10302A-NSG
	Application Number	
Title of Invention	Induction Trash Can Circuit Standby Power-saving Method	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Non-Applicant Assignee Information:

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Assignee 1

Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).

Remove

If the Assignee is an Organization check here. ☒

Organization Name	Nine Stars Group (U.S.A.) Inc.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USP10302A-NSG
	Application Number	
Title of Invention	Induction Trash Can Circuit Standby Power-saving Method	

Mailing Address Information For Non-Applicant Assignee:

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Country i	US	Postal Code	91768
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button. Add

Assignee 2

Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).

Remove

If the Assignee is an Organization check here. ☒

Organization Name	Fujian Nashida Electronic Incorporated Company

Mailing Address Information For Non-Applicant Assignee:

Address 1	Area B,3rd Floor,Building3,Taiwan Entrepreneurship		
Address 2	Park, Jinjingwan Second Road, Beicuo Town,Pingtan,		
City	Fuzhou,Fujian	**State/Province**	
Country i	CN	Postal Code	350401
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

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Signature	/Raymond Y. Chan/			Date (YYYY-MM-DD)	2019-01-06
First Name	Raymond Y.	Last Name	Chan	Registration Number	37484

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	USP10302A-NSG
	Application Number	
Title of Invention	Induction Trash Can Circuit Standby Power-saving Method	

This collection of information is required by 37 CFR 1.76. 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 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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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).

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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 inspections 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.

PTO-1390 (01-18)
Approved for use through 8/31/2019. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371

Attorney Docket No.	
USP10302A-NSG	
U.S. Application No. (if known, see 37 CFR 1.5)	

International Application No.	International Filing Date	Priority Date Claimed
PCT/CN2017/093119	July 17, 2017	April 07, 2017

Title of Invention
Induction Trash Can Circuit Standby Power-saving Method

First Named Inventor
WANG, Xin el at

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ■ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). NOTE: The express request under 35 U.S.C. 371(f) will not be effective unless the requirements under 35 U.S.C. 371(c)(1), (2), and (4) for payment of the basic national fee, copy of the International Application and English translation thereof (if required), and the oath or declaration of the inventor(s) have been received.
2. ■ A copy of the International Application (35 U.S.C. 371(c)(2)) is attached hereto (not required if the International Application was previously communicated by the International Bureau or was filed in the United States Receiving Office (RO/US)).
3. An English language translation of the International Application (35 U.S.C. 371(c)(2))
   a. ■ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
4. An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4))
   a. ■ is attached.
   b. ☐ was previously filed in the international phase under PCT Rule 4.17(iv).

Items 5 to 8 below concern amendments made in the international phase.

PCT Article 19 and 34 amendments

5. ☐ Amendments to the claims under PCT Article 19 are attached (not required if communicated by the International Bureau) (35 U.S.C. 371(c)(3)).
6. ☐ English translation of the PCT Article 19 amendment is attached (35 U.S.C. 371(c)(3)).
7. ☐ English translation of annexes (Article 19 and/or 34 amendments only) of the International Preliminary Examination Report is attached (35 U.S.C. 371(c)(5)).

Cancellation of amendments made in the international phase

8a. ☐ Do not enter the amendment made in the international phase under PCT Article 19.

8b. ☐ Do not enter the amendment made in the international phase under PCT Article 34.

NOTE: A proper amendment made in English under Article 19 or 34 will be entered in the U.S. national phase application absent a clear instruction from applicant not to enter the amendment(s).

The following items 9 to 17 concern a document(s) or information included.

9. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
10. ■ A preliminary amendment.
11. ■ An Application Data Sheet under 37 CFR 1.76.
12. ☐ A substitute specification. NOTE: A substitute specification cannot include claims. See 37 CFR 1.125(b).
13. ■ A power of attorney and/or change of address letter.
14. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.3 and 37 CFR 1.821-1.825 (not required if sequence listing in text format was indicated on the PCT Request as part of the International Application and the sequence listing was published as part of the international application).
15. ■ Assignment papers *(cover sheet and document(s))*. Name of Assignee: 1. Nine Stars Group (U.S.A.) Inc.
    2. Fujian Nashida Electronic Incorporated Company
16. ☐ 37 CFR 3.73(c) Statement *(when there is an Assignee)*.

This collection of information is required by 37 CFR 1.414 and 1.491-1.492. 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 15 minutes 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. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

U.S. APPLN. No. (if known – see 37 CFR 1.5)	INTERNATIONAL APPLICATION No.	ATTORNEY DOCKET No.
	PCT/CN2017/093119	USP10302A-NSG

17. ☐ Other items or information:

The following fees have been submitted.	CALCULATIONS
18. ■ Basic national fee (37 CFR 1.492(a)) **$300**	$ 300.00
19. ■ Examination fee (37 CFR 1.492(c)) • If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... **$0** • All other situations **$760**	$ 760.00
20. ■ Search fee (37 CFR 1.492(b)) • If the written opinion prepared by ISA/US or the international preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)..... **$0** • Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority ..... **$140** • International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB..... **$520** • All other situations **$660**	520.00 $
TOTAL OF 18, 19, and 20 =	$ 1580.00

☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing in compliance with 37 CFR 1.821(c) or (e) in an electronic medium or computer program listing in an electronic medium) (37 CFR 1.492(j)).

Fee for each additional 50 sheets of paper or fraction thereof **$400**

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round **up** to a whole number)	RATE	
- 100 =	/ 50 =		x **$400**	$

Surcharge for furnishing any of the search fee, examination fee, or the oath or declaration after the date of commencement of the national stage (37 CFR 1.492(h))..... **$140**	$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	- 20 =		x **$100**	$
Independent claims	- 3 =		x **$460**	$
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			**+ $820**	$

Fee for submission of Sequence Listing text file of 300 MB to 800 MB (37 CFR 1.21(o)(1))..... **$1,000**	$
Fee for submission of Sequence Listing text file of more than 800 MB (37 CFR 1.21(o)(2))..... **$10,000**	$
Processing fee for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(i))..... **$140 +**	$
TOTAL OF ABOVE CALCULATIONS =	$
■ **Applicant asserts small entity status.** See 37 CFR 1.27. Fees above are reduced by ½.	
☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Fees above are reduced by ¾. Applicant must attach form PTO/SB/15A or B or equivalent.	
TOTAL NATIONAL FEE =	$ 790.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31)..... **$50.00** per property **+**	$
TOTAL FEES ENCLOSED =	$ 790.00

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees.

c. ☒ The Director is hereby authorized to charge additional fees which may be required, or credit any overpayment, to Deposit Account No. 502111 as follows:

i. ☒ any required fee.

ii. ☐ any required fee except for excess claims fees required under 37 CFR 1.492(d) and (e) and multiple dependent claim fee required under 37 CFR 1.492(f).

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. The PTO-2038 should only be mailed or faxed to the USPTO. However, when paying the basic national fee, the PTO-2038 may NOT be faxed to the USPTO.

ADVISORY: If filing by EFS-Web, do **NOT** attach the PTO-2038 form as a PDF along with your EFS-Web submission. Please be advised that this is **not** recommended and by doing so your **credit card information may be displayed via PAIR**. To protect your information, it is recommended to pay fees online by using the electronic payment method.

NOTE: Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the International Application to pending status.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013, and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE 1: By providing this statement under 37 CFR 1.55 or 1.78, **this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA**.

NOTE 2: A U.S. national stage application may not claim priority to the international application of which it is the national phase. The filing date of a U.S. national stage application is the international filing date. See 35 U.S.C. 363.

Correspondence Address

☒ The address associated with Customer Number: 30265 **OR** ☐ Correspondence address below

Name	David and Raymond Patent Firm				
Address	108 N Ynez Ave, #128				
City	Monterey Park	State	CA	Zip Code	91754
Country	USA			Telephone	626-571-9812
Email	raymondc@davidandraymond.com				

Signature	/Raymond Y. Chan/	Date	01/06/2019
Name (Print/Type)	Raymond Y. Chan	Registration No. (Attorney/Agent)	37,484

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
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.

Attorney/Docket No: USP10302A-NSG

DECLARATION FOR UTILITY PATENT APPLICATION

As a below named inventor, I hereby declare that:
My residence, mailing address, and citizenship are as stated below next to my name.
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Induction Trash Can Circuit Standby Power-saving Method

the specification of which is attached hereto unless the following box is checked:

☐ was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).

The above-identified application was made or authorized to be made by me. I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing data of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 USC 119(a)-(d) or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Claimed	Certified Copy Attached
PCT/CN2017/093119 (Number)	CN (Country)	17/07/2017 (Day/Month/Year Filed)	☒ Yes ☐ No	☐ Yes ☐ No
201710223843.1 (Number)	CN (Country)	07/04/2017 (Day/Month/Year Filed)	☒ Yes ☐ No	☐ Yes ☐ No
(Number)	(Country)	(Day/Month/Year Filed)	☐ Yes ☐ No	☐ Yes ☐ No

☐ Additional foreign application numbers are listed on a supplemental priority data sheet attached hereto.

I hereby claimed the benefit under 35 USC 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (Day/Month/Year)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet attached hereto.

I hereby appoint the following attorney(s) and/or agent(s), with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Raymond Yat Chan, Reg. No. 37,484
Address all correspondence to: **108 North Ynez Avenue, Suite 128, Monterey Park, CA 91754, U.S.A.**
Telephone Calls to: **(626) 571-9812**
Facsimile Calls to: **(626) 571-9813**

I hereby declare that all Statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor (given name, family name) Xin Wang

Inventor's signature _____ Date 11/29/2018

Residence Same as below Citizenship CHINA

Mailing Address Floor 1-3, Factory Building 3#, No.16 Builing of West Xincheng Road, Qingkou, Minhou Fuzhou, Fujian 350119, CHINA

Full name of second joint inventor, if any (given name, family name) Jiangqun Chen

Second Inventor's signature 陈江君 Date 2018-11-25

Residence Same as below Citizenship CHINA

Mailing Address Floor 1-3, Factory Building 3#, No.16 Builing of West Xincheng Road, Qingkou, Minhou Fuzhou, Fujian 350119, CHINA

☐ Additional inventors are being named on separately numbered sheets attached hereto.

Petitioner Ex 1002, p. 24
EKO v. Nine Stars, IPR2025-01369

Attorney/Docket No: USP10302A-NSG

Full name of second joint inventor, if any (given name, family name) Zhou Lin

Second Inventor's signature _____ Date 2018.11.25

Residence Same as below Citizenship CHINA

Mailing Address Floor 1-3, Factory Building 3#, No.16 Building of West Xincheng Road, Qingkou, Minhou Fuzhou, Fujian 350119, CHINA

PATENT

Attorney's Docket No.: USP10302A-NSG

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Xin Wang

Filing Date:

Application Number:

Examiner:

Art Unit:

Title Induction Trash Can Circuit Standby Power-saving Method

To: The Commissioner for Patents
Alexandria, VA 22313-1450

POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

As a named applicant/inventor of the entire interest of the above identified application, I hereby revoke all previous powers of attorney given in the above-identified application. I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and trademark Office connected therewith:

Raymond Y. Chan, Reg. No. 37,484

Please recognize or change the correspondence address for the above-identified application to the address associated with

Customer Number: 30265
David and Raymond Patent Firm
108 North Ynez Avenue. Suite 128
Monterey Park, CA 91754, US
Telephone: (626) 571 9812 Fax: (626) 571 9812
Email: raymondc@davidandraymond.com

NAME OF INVENTOR: Xin Wang
ADDRESS: Floor 1-3, Factory Building 3#, No.16 Building of West Xincheng Road, Qingkou, Minhou Fuzhou, Fujian 350119, CHINA

SIGNATURE

DATE 11/29/2018

PATENT

Attorney's Docket No.: USP10302A-NSG

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Xin Wang

Filing Date: _____

Application Number: _____

Examiner: _____

Art Unit: _____

Title: Induction Trash Can Circuit Standby Power-saving Method

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108 North Ynez Avenue, Suite 128
Monterey Park, CA 91754, US
Telephone: (626) 571 9812 Fax: (626) 571 9812
Email: raymonde@davidandraymond.com

NAME OF INVENTOR: Jiangqun Chen
ADDRESS: Floor 1-3, Factory Building 3#, No.16 Building of West Xincheng Road, Qingkou, Minhou Fuzhou, Fujian 350119, CHINA

陈江群
SIGNATURE

2018.11.25
DATE

PATENT

Attorney's Docket No.: USP10302A-NSG

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Xin Wang

Filing Date:

Application Number:

Examiner:

Art Unit:

Title Induction Trash Can Circuit Standby Power-saving Method

To: The Commissioner for Patents
Alexandria, VA 22313-1450

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Customer Number: 30265
David and Raymond Patent Firm
108 North Ynez Avenue, Suite 128
Monterey Park, CA 91754, US
Telephone: (626) 571 9812 Fax: (626) 571 9812
Email: raymondc@davidandraymond.com

NAME OF INVENTOR: Zhou Lin
ADDRESS: Floor 1-3, Factory Building 3#, No.16 Building of West Xincheng Road, Qingkou, Minhou Fuzhou, Fujian 350119, CHINA

SIGNATURE

2018.11.25
DATE

PATENT

Attorney's
Docket No.: USP1G302A-NSG

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Xin Wang

Filing Date: _____

Application Number: _____

Examiner: _____

Art Unit: _____

Title: Induction Trash Can Circuit Standby Power-saving Method

To: The Commissioner for Patents
Alexandria, VA 22313-1450

POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

As a named Assignee of record of the entire interest of the above identified application, I hereby revoke all previous powers of attorney given in the above-identified application. I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and trademark Office connected therewith:

Raymond Y. Chan, Reg. No. 37,484

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Customer Number: 30265
David and Raymond Patent Firm
108 North Ynez Avenue, Suite 128
Monterey Park, CA 91754, US
Telephone: (626) 571 9812 Fax: (626) 571 9812
Email: raymondc@davidandraymond.com

NAME: Xin Wang
ADDRESS: Area B, 3rd Floor, Building 3, Taiwan Entrepreneurship Park, Jinjingwan Second Road, Beicuo Town, Pingtan Fuzhou, Pujian 350401, CN
TITLE AND COMPANY: Director, Fujian Nashida Electronic Incorporated Company

SIGNATURE

2019.12.15
DATE

PATENT

Attorney's
Docket No.: USP10302A-NSG

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: Xin Wang

Filing Date:

Application Number:

Examiner:

Art Unit:

Title: Induction Trash Can Circuit Standby Power-saving Method

To: The Commissioner for Patents
Alexandria, VA 22313-1450

POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

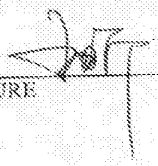
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Raymond Y. Chan, Reg. No. 37,484

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Customer Number: 30265
David and Raymond Patent Firm
108 North Ynez Avenue, Suite 128
Monterey Park, CA 91754, US
Telephone: (626) 571 9812 Fax: (626) 571 9812
Email: raymondc@davidandraymond.com

NAME: Xin Wang
ADDRESS: 1929 Mount Vernon Ave., Pomona, California 91768
TITLE AND COMPANY: Chief Executive Officer, Nine Stars Group (U.S.A.) Inc.



SIGNATURE

2018-12-13
DATE

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日
2018 年 10 月 11 日 (11.10.2018)

WIPO | PCT

(10) 国际公布号
WO 2018/184317 A1

(51) 国际专利分类号:
G05B 19/042 (2006.01) *B65F 1/00* (2006.01)

(21) 国际申请号: PCT/CN2017/093119

(22) 国际申请日: 2017 年 7 月 17 日 (17.07.2017)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
201710223843.1 2017年4月7日 (07.04.2017) CN

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(54) **Title:** POWER-SAVING STANDBY METHOD FOR WASTE BIN SENSING CIRCUIT

(54) **发明名称:** 一种感应垃圾桶电路待机省电方法

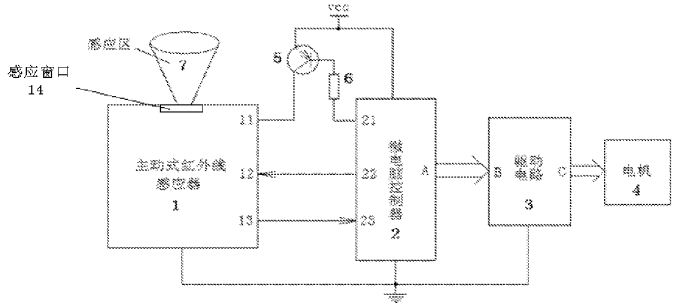


图 1

1 Active infrared sensor
2 Micro-computer controller
3 Drive circuit
4 Motor
7 Sensing region
14 Sensing window

(57) **Abstract:** A power-saving standby method for a waste bin sensing circuit. A waste bin sensing circuit is provided, and includes an active infrared sensor (1), a micro-controller (2), a drive circuit (3), and a motor (4) configured to control a bin lid to open or close, wherein the micro-controller (2) has a hibernation function and watchdog timer, infrared pulse transmission of the active infrared sensor (1) is controlled by the micro-controller (2), and an output end of the active infrared sensor (1) is connected to the micro-controller (2). The power saving method is implemented such that when being in a standby state: the micro-controller (2) controls the active infrared sensor (1) to transmit an infrared pulse signal to a sensing region; if no obstacle is in the sensing region, then the active infrared sensor (1) outputs no signal, and a process of the micro-controller (2) enters into a hibernation state immediately; after remaining in the hibernation state for a period of time, the watchdog timer in the micro-controller (2) wakes up the micro-controller (2) to re-enter an operation state; and the aforementioned procedures are repeated in the standby state. The method significantly reduces a standby current

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GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW。

(84) 指定国(除另有指明，要求每一种可提供的地区保护)：ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG)。

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of the waste bin sensing circuit, improves the battery runtime, provides a superior power saving effect, lowers costs of a customer, and mitigates environment pollution caused by waste batteries.

(57) 摘要：一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线感应器（1）、微控制器（2）、驱动电路（3）、用于控制桶盖开关的电机（4），微控制器（2）具有睡眠功能和看门狗定时器，主动式红外线感应器（1）的红外线脉冲发射由微控制器（2）控制，主动式红外线感应器（1）的输出端连接至微控制器（2），省电方法实现方式为，在待机状态下：由微控制器（2）控制主动式红外线感应器（1）向感应区发射一个红外线脉冲信号，如感应区没有障碍物，主动式红外线感应器（1）无输出信号，微控制器（2）程序即刻就进入到睡眠状态，在睡眠一段时间后，微控制器（2）内部的看门狗定时器唤醒微控制器（2）重新进入工作状态，在待机状态下重复上述过程。本方法大幅度降低了感应垃圾桶电路的待机电流，提高电池使用寿命，达到很好的节电效果，减少了客户的使用成本，降低了废旧电池对环境的污染。

一种感应垃圾桶电路待机省电方法

技术领域

本发明涉及一种感应垃圾桶待机电路省电方法。

背景技术

现有技术的感应翻盖垃圾桶，绝大部分采用主动式红外感应电路，同时采用一次性电池供电，由于感应翻盖垃圾桶的耗电由两部分组成，第一部分为待机耗电量（桶盖不动时）；第二部分为动作耗电量（桶盖运动时），每天总耗电量=每天待机耗电量+每天动作耗电量。其中每天待机耗电量=待机电流×24 小时，动作耗电量=动作平均电流×动作时间×每天使用的次数。每天待机耗电量是由待机电流决定，每天的动作耗电量与动作平均电流、动作时间和每天使用次数成正比。例如：感应翻盖垃圾桶整体电路的待机电流为 1.5mA，每天的待机耗电量=1.5mA×24 小时=36mAh（毫安时），感应翻盖垃圾桶的动作平均电流一般在200mA，开关盖时间各为 1S，按每天使用 20 次计算，那么每天的动作耗电量=200mA×2 秒÷3600×20 次=2.2mAh，每天总耗电量=每天待机耗电量+每天动作耗电量=36mAh+2.2mAh=38.2mAh，如使用碳性高功率 5 号电池容量为 480mAh，只能使用 480÷38.2≈13 天；如使用 5 号碱性电池容量为 1400mAh，只能使用1400÷38.2≈37 天，从以上计算分析，每天的待机耗电量远大于每天动作耗电量，所以要想降低感应翻盖垃圾桶的耗电，主要是要想办法降低待机时的电流。

发明内容

本发明的目的在于提供一种感应垃圾桶电路待机省电方法，该方法大幅度降低了感应垃圾桶电路的待机电流，提高电池使用寿命，达到很好的节电效果，减少了客户的使用产本，减低了废旧电池对环境的污染。

为实现上述目的，本发明的技术方案是：一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输

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出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

在本发明一实施例中，所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

在本发明一实施例中，所述预设时间未 100ms~500ms 之间。

在本发明一实施例中，所述预设阈值时间未 2ms~50ms 之间。

在本发明一实施例中，所述的感应区位于垃圾桶前桶沿的感应窗口上方。

相较于现有技术，本发明具有以下有益效果：本发明方法大幅度降低了感应垃圾桶电路的待机电流，提高电池使用寿命，达到很好的节电效果，减少了客户的使用产本，减低了废旧电池对环境的污染。

附图说明

图 1 为图 1 是一种感应垃圾桶电路的待机省电方法电路框图。

图 2 是一种感应垃圾桶电路的待机省电方法程序框图。

图 3 是一种感应垃圾桶电路的待机省电方法具体电路图。

图中：

1-主动式红外线感应器、 11-主动式红外线感应器的电源端、12-主动式红外

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线感应器的红外线脉冲发射控制端、13-主动式红外线感应器的信号输出端、14-感应窗口、2-微电脑控制器、21-微电脑控制器控制主动式红外线感应器电源的输出端口、22-微电脑控制器控制主动式红外线感应器向感应区发射红外线脉冲信号的输出端口、23-微电脑控制器接收主动式红外线感应器输出信号的输入端口、A-微电脑控制器控制驱动电路的输出端口组、 3-驱动电路、B-驱动电路控制端口组、C-驱动电路输出端口组、4-电机、5-PNP 型三级管、6-限流电阻、7-感应区。

具体实施方式

下面结合附图，对本发明的技术方案进行具体说明。

本发明的一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

所谓主动式红外线感应器原理是感应器主动向感应区发射红外线探测信号，红外线遇到障碍被反射回来，反射回来的微弱信号被感应器放大和比较后输出。主动式红外线感应器的耗电电流一般在 0.03 mA ~0.6mA，视主动式红外线感应器内部使用的芯片的耗电指标而定，一般芯片耗电指标越低价格就越高。微电脑控制器在工作状态下耗电电流一般在 1.3 mA 左右，微电脑控制器在睡眠状态下为 1μA（可以忽略不计），如果不采用上述技术情况下，感应垃圾桶整体电路的

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待机电流在 1.33mA~1.90mA 之间；如果采用本专利上述的技术，在待机状态下：微电脑控制器工作时间设置为 5mS(发射和接收红外线脉冲的时间), 睡眠时间设置为 300mS(看门狗定时器 WDT 唤醒的时间),微电脑控制器的平均耗电电流≈5÷300×1.3 mA≈0.022 mA，感应垃圾桶整体电路的待机电流在 0.052mA~0.622mA 之间，每天待机耗电量约为 1.248 mAh ~14.93mAh，按每天使用 20 次计算，每天的动作耗电量=2.2 毫安时，每天总耗电量 3.45 mAh ~17.13 mAh，如使用碳性高功率 5 号电池容量为 480mAh，理论上约能使用 139 天~28 天，如果主动式红外线感应器内部使用的芯片采用低功耗高价格的情况下，139 天完全能满足实际要求；如使用 5 号碱性电池容量为 1400mAh，理论上约能使用 405 天~81 天。

进一步的，本发明的省电方法还可采用如下方式：

所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

这样做的目的是可以让主动式红外线感应器处于间歇工作状态，进一步降低感应垃圾桶整体电路的待机电流，同时也可以使主动式红外线感应器内部使用的芯片的耗电指标不需要太高，降低芯片的价格，从而降低整体产品的成本。按本专利上述方案的技术，微电脑控制器从睡眠中被看门狗定时器 WDT 唤醒，首先打开主动式红外线感应器的电源，然后延时一段极短的时间为 8ms，微电脑控制器工作时间设置为 13mS，睡眠时间设置为 300mS，主动式红外线感应器的平均耗电电流=[（0.03 mA -0.01 mA）~(0.6mA-0.01mA）)×13÷300+0.01mA≈0.011 mA ~0.036 mA（上式中的 0.01mA 为红外线脉冲发射的平均电流），微电脑控制

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器的平均耗电电流≈13÷300×1.3 mA≈0.056 mA，感应垃圾桶整体电路的待机电流在 0.067mA~0.092mA 之间，每天待机耗电量约为 1.61 mAh ~2.21mAh，按每天使用 20 次计算，每天的动作耗电量=2.2 毫安时，每天总耗电量 3.81 mAh ~4.41mAh，如使用碳性高功率 5 号电池容量为 480mAh，能使用 126 天~109 天，从上述理论计算结果，即使主动式红外线感应器内部使用的芯片采用耗电指标大（价格低），也能使用 109 天，完全能满足实际要求；如使用 5 号碱性电池容量为 1400mAh，理论上约能使用 367 天~317 天。

所述预设时间未 100ms~500ms 之间。所述预设阈值时间未 2ms~50ms 之间。

所述的感应区位于垃圾桶前桶沿的感应窗口上方。

以下为本发明的具体实施过程。

参见图 1 和图 2，本实施例包括主动式红外线感应器 1、微电脑控制器（即微控制器）2、驱动电路 3、电机 4、PNP 型三级管 5 和限流电阻 6。微电脑控制器 2 采用具有睡眠功能和带有看门狗定时器 WDT 的芯片，主动式红外线感应器 1 电源端 11 的供电，由微电脑控制器 2 通过输出端口 21 控制，当微电脑控制器 2 输出端口 21 为高电平时，通过电阻 6 使 PNP 型三级管 5 的基极为高电平，基极不导通，三级管 5 截止，切断主动式红外线感应器 1 的电源；当微电脑控制器 2 输出端口 21 为低电平时，通过限流电阻 6 使三级管 5 基极导通，三级管 5 饱和导通，主动式红外线感应器 1 的电源端 11 接通电源。在待机状态下：微电脑控制器 2 从睡眠中被看门狗定时器 WDT 唤醒，首先置输出端口 21 为低电平，使主动式红外线感应器 1 接通电源 Vcc，然后延时 8ms 的时间，让主动式红外线感应器 1 电路稳定后，再通过输出端口 22 控制主动式红外线感应器 1 向感应区 7 发射一个红外线脉冲信号，此时如感应区 7 内没有障碍物，主动式红外线感应器 1 的输出端口 13 为低电平（无输出信号），微电脑控制器 2 的输入端口 23 也为低电平（无信号输入），微电脑控制器 2 的输入端口 23 接收不到红外线脉冲反射信号，微电脑控制器 2 的程序即刻将端口 21 置为高电平，通过电阻 6 和三极管 5 切断主动式红外线感应器 1 的电源，然后再进入到睡眠状态，在睡眠 300ms 时间后，微电脑控制器 2 内部的看门狗定时器 WDT 唤醒微电脑控制器 2 重新进入工作状态，在待机状态下重复上述过程；如感应区 7 有障碍物，主动式红外线感应器 1 的输出端口 13 为高电平（有输出信号），微电脑控制器 2 的输入端口

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23 也为高电平（有信号输入），微电脑控制器 2 的输入端口 23 接收到红外线脉冲反射信号，微电脑控制器 2 的程序在接收到主动式红外线感应器 1 的输出信号后，微电脑控制器 2 就不进入睡眠状态，保持工作状态，微电脑控制器 1 通过输出端口组 A 控制驱动电路输入端口组 B，使驱动电路 3 通过输出端口组 C 带动电机 4 正向转，电机 4 带动桶盖开启并延时 3 秒后，微电脑控制器 1 再控制驱动电路 3 带动电机 4 反向转，将桶盖关闭后微电脑控制器 2 再进入待机状态（驱动电路的控制为现有技术，本实施例不在详细说明）。

在待机状态下，传统技术的感应翻盖垃圾桶整体电路的待机电流约为 1.5mA，采用本专利技术的感应翻盖垃圾桶整体电路的待机电流控制在 0.067mA~0.092mA 之间，待机电流约减少了 22~16 倍。

本实施例的一种感应垃圾桶电路待机省电方法，其微电脑控制器 1 的程序框图见图 2。电路上电后，植入在微电脑控制器 1 内的应用程序从步骤 S101 开始执行，执行程序的各步骤内容如下所述：

S101 步骤：上电或唤醒复位都执行该步骤，如果是上电就执行 S102 进行程序初始化；如果是从睡眠中被唤醒就执行 S103。

S102 步骤：程序初始化，将端口 21 设置为输出口，且置为 1（高电平）；将端口 22 设置为输出口，且置为 0（低电平）；将端口 23 设置为输入口；将端口组 A 设置为输出口，且控制驱动电路不工作，电机不转动。

S103 步骤：置端口 21 为 0（低电平），使主动式红外线感应器 1 接通电源 Vcc。

S104 步骤：延时 8ms 的时间，让主动式红外线感应器 1 电路稳定。

S105 步骤：端口 22 输出一脉冲信号，控制主动式红外线感应器 1 向感应区 7 发射一个红外线脉冲信号。

S106 步骤：判断端口 23 是否接收到红外线脉冲反射信号，如果没接收到执行 S107 步骤；如果有接收到执行 S109 步骤。

S107 步骤：置端口 21 为 1（高电平），切断主动式红外线感应器 1 的电源。

S108 步骤：行睡眠程序 300mS，唤醒后执行 S101 步骤。

S109 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 带动电机 4 正向转 1 秒钟。

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S110 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 让电机 4 停止转动，并保持 3 秒钟。

S111 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 带动电机 4 反向转 1 秒钟，然后执行 S107 步骤。

本实施例的具体电路图见图 3，主动式红外线感应器 1，由双运算放大器 IC1(型号为 LM358)、红外发射管 D1，红外接收管 D2，三极管 Q1，电容 C0、C1、C2、C5、C6、C13，电阻 R1、R2、R3、R4、R6、R7、R9、R10、W1、W2、R11、R16、R30 构成。微电脑控制器 2 采用型号 EM78P153。驱动电路 3，由 PNP 三极管 Q2 和 Q4（型号为 SS8550D），NPN 三极管 Q3 和 Q5（型号为 SS8050D），二极管 D10 和 D11，电阻 R18、R19、R20 和 R21 构成。电机 4 选用永磁直流电机型号 RF-500TB。R38 和 C9 电源滤波用。

参见图 2 和图 3，工作原理叙述如下：微电脑控制器 2 上电时执行 S101 步骤，然后转入 S102 步骤进行程序初始化，将端口 21（微电脑控制器 2 第 2 脚）设置为输出口，且置为高电平，PNP 三极管 5 截止，主动式红外线感应器 1 的电源被 PNP 三极管 5 切断；将端口 22（微电脑控制器 2 第 5 脚）设置为输出口，且置为高电平，三极管 Q1 截止，红外发射管 D1 不发射信号；将端口 23（微电脑控制器 2 第 8 脚）设置为输入口；将端口组 A（微电脑控制器 2 的第 1、12、13、14 脚）设置为输出口，且置 1 脚和 12 脚为低电平，13 脚和 14 脚为高电平，三级管 Q2~Q5 截止，驱动电路 3 不工作，电机不转动。然后程序执行 S103 步骤，将微电脑控制器 2 第 2 脚且置为低电平，PNP 三极管 5 导通，主动式红外线感应器 1 的电源通过 R38 和 C9 滤波后得电，然后程序执行 S104 步骤延时 8mS 使主动式红外线感应器 1 的电路稳定后，再执行 S105 步骤，微电脑控制器 2 第 5 脚输出一负脉冲信号，红外发射管 D1 向感应区 7 发射红外线脉冲信号，然后程序执行 S106 步骤判断微电脑控制器端口 23（微电脑控制器 2 第 8 脚）是否接收到红外线脉冲反射信号，如果微电脑控制器 2 第 8 脚为低电平（无反射信号）就执行 S107 步骤；如果为高电平（有反射信号）就执行 S109 步骤（关于 LM358 和外围元件构成的主动式红外线感应器 1 的原理为公知技术这里不再叙述）。在 S107 步骤里置微电脑控制器端口 21（第 2 脚）为高电平，切断主动式红外线感应器 1 的电源，然后执行 S108 步骤睡眠程序运行 300mS，唤醒后执行 S101 步

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骤。在有反射信号时执行 S109 步骤，微电脑控制器 2 置端口组 A 中的第 1 脚和第 14 脚为高电平，置第 12 脚和 13 脚为低电平，致使 Q2 和 Q5 导通，Q3 和 Q4 截止，电机 4 正向转动 1 秒将桶盖打开。然后执行 S110 步骤微电脑控制器 2 置端口组 A 中的第 13 脚、第 14 脚、第 1 脚和 12 脚为高电平，致使 Q3 和 Q5 导通，Q2 和 Q4 截止，此时电机不得电，但处于制动状态（由于 Q3 和 Q5 导通和二级管 D10 和 D11 构成电机两端正反向通路，桶盖不容易因重力掉落下来），开盖状态保持 3 秒。然后执行 S111 步骤微电脑控制器 2 置端口组 A 中的第 1 脚和第 14 脚为低电平，置第 12 脚和 13 脚为高电平，致使 Q4 和 Q3 导通，Q2 和 Q5 截止，电机 4 反向转动 1 秒将桶盖关闭，然后程序转入 S107 步骤回到待机状态。

本实例未描述部分与现有技术相同。

以上是本发明的较佳实施例，凡依本发明技术方案所作的改变，所产生的功能作用未超出本发明技术方案的范围时，均属于本发明的保护范围。

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权利要求书

1．一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，其特征在于：所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

2．根据权利要求 1 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

3．根据权利要求 1 或 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述预设时间未 100ms~500ms 之间。

4．根据权利要求 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述预设阈值时间未 2ms~50ms 之间。

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5．根据权利要求 1 或 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述的感应区位于垃圾桶前桶沿的感应窗口上方。

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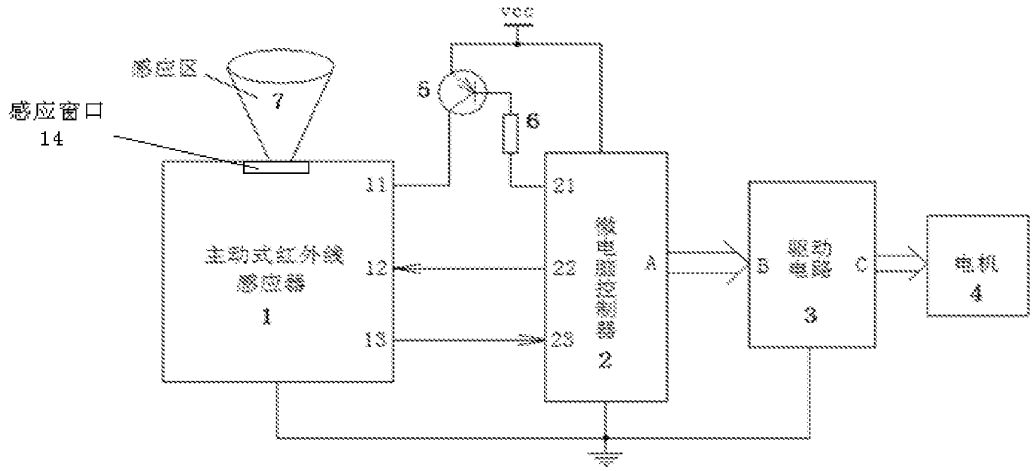


图 1

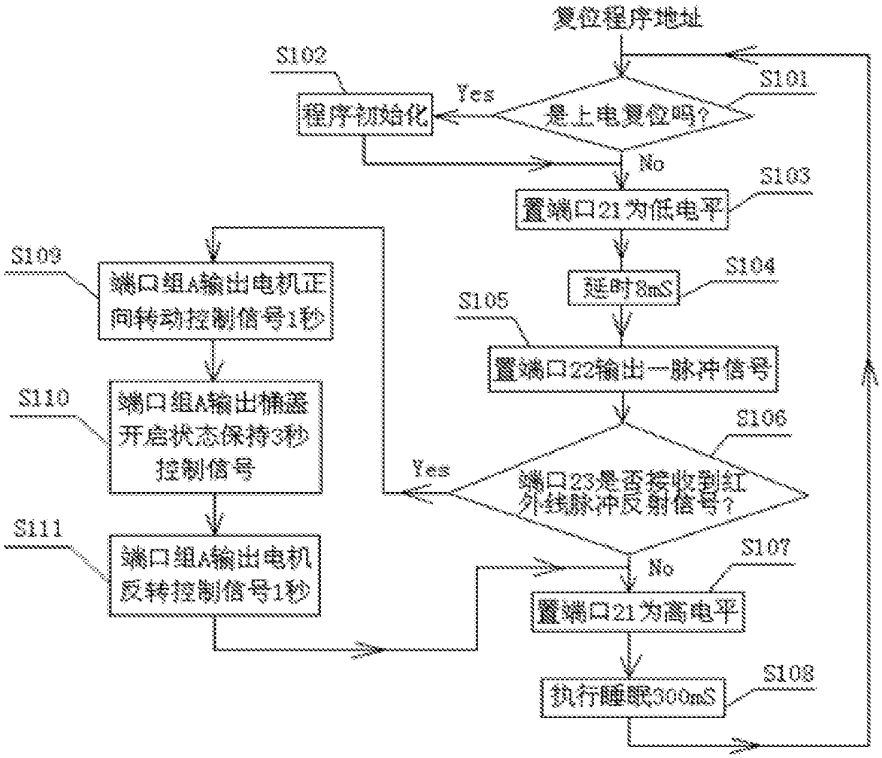


图 2

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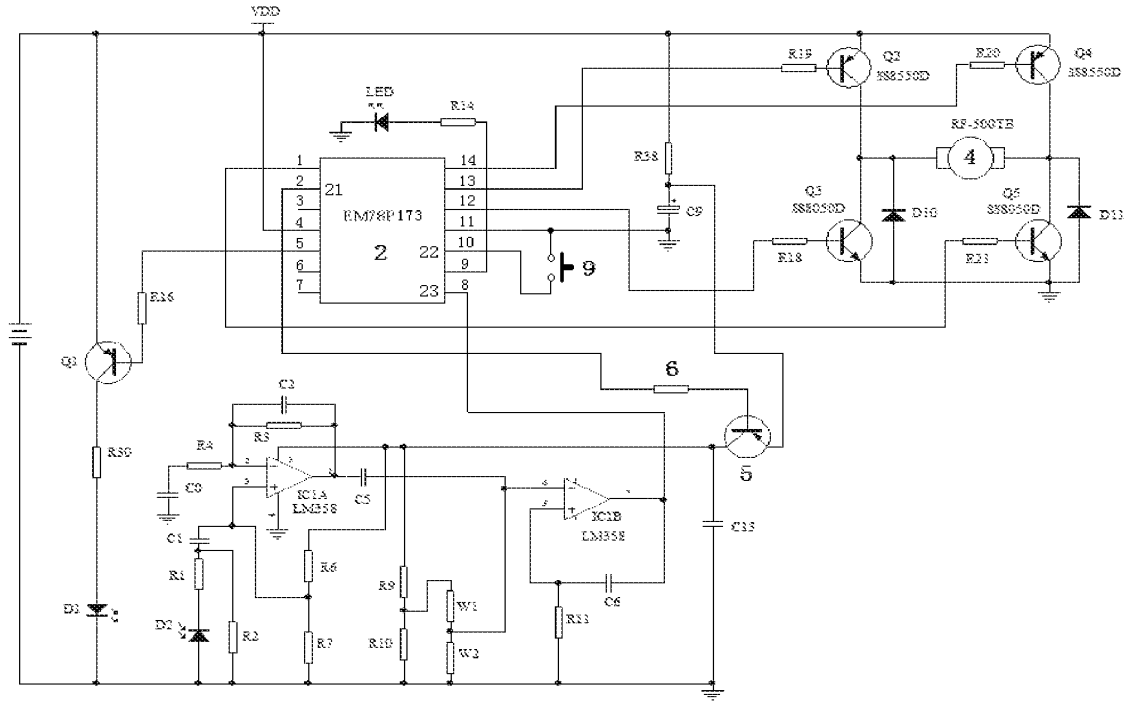


图 3

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/093119

A. CLASSIFICATION OF SUBJECT MATTER

G05B 19/042 (2006.01) i; B65F 1/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G05B B65F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, WPI, EPODOC, CNKI: 福建纳仕达电子股份有限公司, 王昕, 垃圾桶, 红外, 待机, 感应, 传感, 感测, 检测, 看门狗, 定时, 晶振, 唤醒, 睡眠, 休眠, dustbin, detect, sens+, induc+, infrar+, electric+, sav+, watchdog, timer, sleep, state, wake up

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 106886182 A (FUJIAN NINE STARS ELECTRONIC CO., LTD.) 23 June 2017 (23.06.2017), claims 1-5	1-5
Y	CN 103439899 A (ZHEJIANG YUYAO XINYU SANITARY WARE CO., LTD.) 11 December 2013 (11.12.2013), description, paragraphs [0032]-[0037]	1-5
Y	CN 2889965 Y (WANG, Xin et al.) 18 April 2007 (18.04.2007), description, page 3, line 24 to page 7, line 2	1-5
A	CN 203909319 U (CHONGQING DIKUANG TECHNOLOGY CO., LTD.) 29 October 2014 (29.10.2014), entire document	1-5
A	CN 101776872 A (SHEN, Haiqiao) 14 July 2010 (14.07.2010), entire document	1-5
A	CN 203819844 U (NANCHANG HANGKONG UNIVERSITY) 10 September 2014 (10.09.2014), entire document	1-5

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 December 2017	09 January 2018

Name and mailing address of the ISA	Authorized officer
State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	LIU, Jing Telephone No. (86-10) 62413459

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/093119

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 203033276 U (WANG, Xin) 03 July 2013 (03.07.2013), entire document	1-5
A	CN 203094879 U (SHENZHEN GREENSITE ENVIRONMENTAL & ENERGY TECHNOLOGY LTD.) 31 July 2013 (31.07.2013), entire document	1-5
A	JP 2004231237 A (CLEANUP CORP. et al.) 19 August 2004 (19.08.2004), entire document	1-5

Form PCT/ISA /210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/093119

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 106886182 A	23 June 2017	None	
CN 103439899 A	11 December 2013	None	
CN 2889965 Y	18 April 2007	WO 2006097019 A1	21 September 2006
		US 2009057317 A1	05 March 2009
		EP 1918223 A1	07 May 2008
		US 7714527 B2	11 May 2010
CN 203909319 U	29 October 2014	None	
CN 101776872 A	14 July 2010	CN 101776872 B	18 January 2012
CN 203819844 U	10 September 2014	None	
CN 203033276 U	03 July 2013	None	
CN 203094879 U	31 July 2013	None	
JP 2004231237 A	19 August 2004	None	

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国际检索报告

国际申请号
PCT/CN2017/093119

A. 主题的分类

G05B 19/042(2006.01)i; B65F 1/00(2006.01)i

按照国际专利分类(IPC)或者同时按照国家分类和IPC两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

G05B B65F

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

CNPAT,WPI,EPODOC,CNKI: 福建纳仕达电子股份有限公司，王昕，垃圾桶，红外，待机，感应，传感，感测，检测，看门狗，定时，晶振，唤醒，睡眠，休眠，dustbin，detect，sens+，induc+，infrar+，electric+，sav+，watchdog，timer，sleep，state，wake up

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求
PX	CN 106886182 A（福建纳仕达电子股份有限公司）2017年 6月 23日（2017 - 06 - 23） 权利要求1-5	1-5
Y	CN 103439899 A（余姚市心雨洁具有限公司）2013年 12月 11日（2013 - 12 - 11） 说明书第[0032]-[0037]段	1-5
Y	CN 2889965 Y（王昕 等）2007年 4月 18日（2007 - 04 - 18） 说明书第3页第24行-第7页第2行	1-5
A	CN 203909319 U（重庆地矿科技有限公司）2014年 10月 29日（2014 - 10 - 29） 全文	1-5
A	CN 101776872 A（沈海桥）2010年 7月 14日（2010 - 07 - 14） 全文	1-5
A	CN 203819844 U（南昌航空大学）2014年 9月 10日（2014 - 09 - 10） 全文	1-5
A	CN 203033276 U（王昕）2013年 7月 3日（2013 - 07 - 03） 全文	1-5

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国际检索实际完成的日期	国际检索报告邮寄日期
2017年 12月 18日	2018年 1月 9日
ISA/CN的名称和邮寄地址 中华人民共和国国家知识产权局(ISA/CN) 中国北京市海淀区蓟门桥西土城路6号 100088 传真号 (86-10)62019451	受权官员 刘晶 电话号码 (86-10)62413459

表 PCT/ISA/210（第2页）（2009年7月）

国际检索报告

国际申请号
PCT/CN2017/093119

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求
A	CN 203094879 U（深圳市格林赛特环保能源科技有限公司）2013年 7月 31日（2013 - 07 - 31） 全文	1-5
A	JP 2004231237 A（CLEANUP CORP. 等）2004年 8月 19日（2004 - 08 - 19） 全文	1-5

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检索报告引用的专利文件			公布日（年/月/日）	同族专利			公布日（年/月/日）
CN	106886182	A	2017年 6月 23日	无			
CN	103439899	A	2013年 12月 11日	无			
CN	2889965	Y	2007年 4月 18日	WO	2006097019	A1	2006年 9月 21日
				US	2009057317	A1	2009年 3月 5日
				EP	1918223	A1	2008年 5月 7日
				US	7714527	B2	2010年 5月 11日
CN	203909319	U	2014年 10月 29日	无			
CN	101776872	A	2010年 7月 14日	CN	101776872	B	2012年 1月 18日
CN	203819844	U	2014年 9月 10日	无			
CN	203033276	U	2013年 7月 3日	无			
CN	203094879	U	2013年 7月 31日	无			
JP	2004231237	A	2004年 8月 19日	无			

表 PCT/ISA/210（同族专利附件）（2009年7月）

TITLE

Induction Trash Can Circuit Standby Power-saving Method

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BACKGROUND OF THE PRESENT INVENTION

FIELD OF INVENTION

[0002] The present invention relates to a power-saving method for the standby circuit of an induction trash can.

DESCRIPTION OF RELATED ARTS

[0003] Conventional induction trash cans mostly apply active infrared sensing circuit and disposable battery power. The power consumption of an induction trash can consists of two parts. One is standby power consumption (when lid is motionless). The other is action power consumption (when lid moves). The daily total power consumption equals to daily standby power consumption plus daily action power consumption. The daily standby power consumption equals to the standby current multiplied by 24 hours. The daily action power consumption equals to average current of the action multiplied by action time multiplied by operation frequency of the day. The daily standby power

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consumption is decided by the standby current. The daily action power consumption is in direct proportion to the average current of the action, the action time, and the operation frequency of the day. For example, the standby current of the entire circuit of an induction trash can is 1.5mA. The daily standby power consumption is 1.5mA*24 hours=36mAh. The average current of the action of the induction trash can is about 200mA. The time for opening or closing the lid is 1 second. If it is utilized for 20 times a day, then the daily action power consumption will be 200mA*2s/3600*20 times=2.2mAh. Hence, since the daily total power consumption equals to daily standby power consumption plus daily action power consumption, it will be 36mAh+2.2mAh=38.2mAh. If an AA zinc–carbon battery, which capacity is 480mAh, is utilized, it can only work for 480/38.2≈13 days. If an AA alkaline battery, which capacity is 1400mAh, is utilized, it can only work for 1400/38≈37 days. Based on the above calculation, the daily standby power consumption is much greater than the daily action power consumption. Therefore, if one aims to reduce the power consumption of an induction trash can, he/she should mainly consider lower the standby current thereof.

SUMMARY OF THE PRESENT INVENTION

[0004] An object of the present invention is to provide a standby power-saving method for induction trash can circuit, which can greatly reduce the standby current of the induction trash can, extend the battery life, achieve an excellent power-saving effect, reduce the use cost for the users, and decrease pollution caused by used batteries.

[0005] In order to achieve the above and other objects, the technical solution of the present invention provides a standby power-saving method for induction trash can circuit. The induction trash can circuit comprises an active infrared sensor, a microcontroller, a driving circuit, a motor to open and close the lid. The microcontroller has a sleep function and a watchdog timer. The emission of the infrared pulse of the active infrared sensor is controlled by the microcontroller. The output port of the active infrared sensor is connected to the microcontroller. The power-saving method is embodied as follows.

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[0006] When the induction trash can circuit is in a standby state, the microcontroller controls the active infrared sensor to emit an infrared pulse signal to the induction area. If there is no obstacle in the induction area, the active infrared sensor will not output signal. Because the microcontroller does not receive any output signal from the active infrared sensor, it will enter a sleep state. After it has slept for a preset time, the watchdog timer disposed in the microcontroller will wake up the microcontroller, so as to have the microcontroller reenter the working state and repeat the above procedure under the standby state. On the other hand, if there is an obstacle in the induction area, the active infrared sensor will output a signal. The microcontroller received the output signal from the active infrared sensor will remain in the working state and conduct the following process: utilizing the driving circuit to drive the motor to rotate forward, delaying for a few seconds after the motor has driven the lid to open, controlling the driving circuit to drive the motor to rotate backward, reentering the sleep state after the lid is closed.

[0007] According to an embodiment of the present invention, the power supply of the active infrared sensor is controlled by the microcontroller that the microcontroller will cut off the power supply of the active infrared sensor when the microcontroller enters the sleep state. When the microcontroller is woken up by the watchdog timer when the induction trash can circuit is in a standby state, the microcontroller will first restore the power supply of the active infrared sensor and delay for a preset threshold time for the active infrared sensor to enter a stable working state and then control the active infrared sensor to emit an infrared pulse signal to the induction area. If there is no obstacle in the induction area, the active infrared sensor will not output signal and because the microcontroller does not receive output signal from the active infrared sensor, the microcontroller will switch off the power source of the active infrared sensor and reenter the sleep state. After a preset time of sleeping, the watchdog timer disposed in the microcontroller will wake up the microcontroller and turn it back into the working state. The induction trash can circuit under the standby state will repeat the above procedure.

[0008] According to an embodiment of the present invention, the preset time is between 100ms and 500ms.

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[0009] According to an embodiment of the present invention, the preset threshold time is between 2ms and 50ms.

[0010] According to an embodiment of the present invention, the induction area is above the induction window that is located on the front can edge of the trash can.

[0011] Contrasting to the conventional technology, the method provided by the present invention has the following advantages: the standby current of the induction trash is greatly reduced, the battery life is extended, an excellent power-saving effect is achieved, the use cost of the user is reduced, and pollution caused by used batteries can be decreased.

[0012] Still further objects and advantages will become apparent from a consideration of the ensuing description and drawings.

[0013] These and other objectives, features, and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a block diagram of the circuit of a standby power-saving method of the induction trash can circuit according to the present invention.

[0015] FIG. 2 is a flow diagram of the standby power-saving method of the induction trash can according to the present invention.

[0016] FIG. 3 is a circuit diagram of the standby power-saving method of the induction trash can according to the present invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] The following description is disclosed to enable any person skilled in the art to make and use the present invention. Preferred embodiments are provided in the following description only as examples and modifications will be apparent to those skilled in the art. The general principles defined in the following description would be applied to other embodiments, alternatives, modifications, equivalents, and applications without departing from the spirit and scope of the present invention.

[0018] The technology of the present invention will be described in detail with the illustration of the drawings.

[0019] The present invention provides a standby power-saving method for induction trash can circuit. The induction trash can circuit comprises an active infrared sensor, a microcontroller, a driving circuit, a motor to open and close the lid. The microcontroller has a sleep function and a watchdog timer. The emission of the infrared pulse of the active infrared sensor is controlled by the microcontroller. The output port of the active infrared sensor is connected to the microcontroller. The power-saving method is embodied as follows.

[0020] When the induction trash can circuit is in a standby state, the microcontroller controls the active infrared sensor to emit an infrared pulse signal to the induction area. If there is no obstacle in the induction area, the active infrared sensor will not output signal. Because the microcontroller does not receive any output signal from the active infrared sensor, it will enter a sleep state. After it has slept for a preset time, the watchdog timer disposed in the microcontroller will wake up the microcontroller, so as to have the microcontroller reenter the working state and repeat the above procedure under the standby state. On the other hand, if there is an obstacle in the induction area, the active infrared sensor will output a signal. The microcontroller received the output signal from the active infrared sensor will remain in the working state and conduct the following process: utilizing the driving circuit to drive the motor to rotate forward, delaying for a

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few seconds after the motor has driven the lid to open, controlling the driving circuit to drive the motor to rotate backward, reentering the sleep state after the lid is closed.

[0021] The working principle of the active infrared sensor is to have the sensor emit infrared detection signal to the induction area and if the infrared hits an obstacle and is reflected, the weak reflected signal will be amplified, compared, and output by the sensor. The power consumption of an active infrared sensor is usually around 0.03 mA~0.6mA, based on the electricity consuming index of the chip utilized in the active infrared sensor. The lower the electricity consuming index of the chip is, the higher the price thereof will be. The power consumption of the microcontroller is usually around 1.3mA under working state and below 1μA under sleep state (which is negligible). Without utilizing the above technology, the standby current of the entire circuit of the induction trash can will be 1.33mA~1.90mA. Nevertheless, by utilizing the above technology of the present invention, if the operating time of the microcontroller under standby state is disposed as 5ms (time for emitting and receiving infrared pulse) and the sleep time is disposed as 300ms (time for the watchdog timer (WDT) to wake it up), the average power consumption of the microcontroller will approximately be 5/300*1.3 mA≈0.022 mA and the standby current of the entire circuit of the induction trash can will be 0.052mA~0.622mA. Therefore, its daily standby power consumption will approximately be 1.248mAh ~14.93mAh. If it is utilized for 20 times a day, the daily action power consumption will be 2.2mAh. Hence, the daily total power consumption will be 3.45 mAh~17.13mAh. If an AA zinc–carbon battery, which capacity is 480mAh, is utilized, it can work for 28~139 days theoretically. By utilizing an expensive power-saving chip in the active infrared sensor, the 139 day service life can completely satisfy the real demand. If an AA alkaline battery, which capacity is 1400mAh, is utilized, it can work for 81~405 days theoretically.

[0022] Further, the power-saving method of the present invention may also utilize the following means.

[0023] The power source and supply of the active infrared sensor is controlled by the microcontroller. When the microcontroller enters the sleep state, it will cut off the power

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supply of the active infrared sensor. Besides, when the induction trash can circuities under the standby state:

[0024] When the microcontroller is woken up by the watchdog timer, the microcontroller will first restore the power supply of the active infrared sensor and delay for a preset threshold time for the active infrared sensor to enter a stable working state and then control the active infrared sensor to emit an infrared pulse signal to the induction area. If there is no obstacle in the induction area, the active infrared sensor will not output signal and because the microcontroller does not receive output signal from the active infrared sensor, the microcontroller will switch off the power source of the active infrared sensor and reenter the sleep state. After a preset time of sleeping, the watchdog timer disposed in the microcontroller will wake up the microcontroller and turn it back into the working state. The induction trash can circuit under the standby state will repeat the above procedure.

[0025] An advantage of this method is to allow the active infrared sensor be in the working state intermittently, so as to further reduce the standby current of the induction trash can. Besides, it does not require high electricity consuming index chip utilized in the active infrared sensor, such that the cost on the chip can be lowered and the total cost of the entire product can be reduced. Based on the above technology of the present invention, when the microcontroller is woken up by the watchdog timer (WDT), it will first power on the active infrared sensor and delay for an extremely short time, 8ms. If the operating time of the microcontroller is disposed as 13ms and the sleep time is disposed as 300ms, the average power consumption of the active infrared sensor will be [(0.03mA-0.01mA)~(0.6mA-0.01mA))*13/300+0.01mA≈**0.011mA~0.036 mA (the 0.01mA in the** equation is the average current for emitting an infrared pulse). The average power consumption of the microcontroller will approximately be 13/300*1.3mA≈**0.056mA. The** standby current of the entire circuit of the induction trash can will be 0.067mA~0.092mA. The daily standby power consumption will approximately be 1.61mAh~2.21mAh. If the operation frequency is 20 times a day, the daily action power consumption will be 2.2mAh. Hence, the daily total power consumption will be 3.81mAh~4.41mAh. If an AA

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zinc–carbon battery, which capacity is 480mAh, is utilized, it can work for 109~126 days. Based on the above theoretical calculation, even if a high electricity consuming index chip (which is cheap) is utilized in the active infrared sensor, it can also work for 109 days, which can totally satisfy the real demand. Moreover, if an AA alkaline battery, which capacity is 1400mAh, is utilized, it can work for 317~367 days theoretically.

[0026] The preset time is between 100ms and 500ms. The preset threshold time is between 2ms and 50ms.

[0027] The induction area is above the induction window that is located on the front can edge of the trash can.

[0028] An implementation of the present invention is illustrated as follows.

[0029] Referring to Figs. 1 and 2, an induction trash can according to an embodiment of the present invention comprises an active infrared sensor 1, a microcontroller 2, a driving circuit 3, a motor 4, a PNP triode 5, and a current limiting resistor 6. The microcontroller 2 utilizes a chip with sleep function and watchdog timer (WDT). The power supply to the power port 11 of the active infrared sensor 1 is controlled by the output port 21 of the microcontroller 2. When the output port 21 of the microcontroller 2 is at high level, the base electrode of the PNP triode 5 will be at high level due to the resistor 6. Thus, the base electrode will not be connected and the triode 5 will be cut off, such that the power of the active infrared sensor 1 will be cut off. When the output port 21 of the microcontroller 2 is at low level, the base electrode of the PNP triode 5 will be connected due to the current limiting resistor 6. Thus, the triode 5 will be in saturation, so as to connect the power source to the power port 11 of the active infrared sensor 1. When the microcontroller 2 in a sleep state is woken up by the watchdog timer (WDT), it will first dispose the output port 21 to low level, so as to connect the active infrared sensor 1 to the power source Vcc. Then it will delay for 8ms to allow the circuit of the active infrared sensor 1 become stable. Next, it will, through the output port 22, control the active infrared sensor 1 to emit an infrared pulse signal to the induction area 7. If there is no obstacle in the induction area 7, the output port 13 of the active infrared sensor 1 will

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be at low level (i.e. no output signal) and the input port 23 of the microcontroller 2 will consequently be at low level (i.e. no input signal). Since the input port 23 of the microcontroller 2 does not receive any reflection signal of the infrared pulse, the program of the microcontroller 2 will turn port 21 into high level immediately, so as to cut off the power source of the active infrared sensor 1 through the resistor 6 and the triode 5 and then enter the sleep state. After 300ms of sleep, the watchdog timer (WDT) in the microcontroller 2 will wake up the microcontroller 2 to return to the working state and repeat the above procedure under the standby state. If there is an obstacle in the induction area 7, the output port 13 of the active infrared sensor 1 will be at high level (i.e. an output signal) and the input port 23 of the microcontroller 2 will consequently be at high level (i.e. an input signal). Since the input port 23 of the microcontroller 2 has received a reflection signal of the infrared pulse, the program of the microcontroller 2 will remain in the working state rather than enter the sleep state after received the output signal of the active infrared sensor 1. Then the microcontroller 1 will utilize the output port group A to control the input port group B of the driving circuit to have the driving circuit 3 to utilize the output port group C to drive the motor 4 to rotate forward, such that the motor 4 will bring the lid to open and delay for 3 seconds. Next, the microcontroller 1 will control the driving circuit 3 again to drive the motor 4 to rotate backward to close the lid. Then the microcontroller 2 will reenter the standby state. (The control of the driving circuit is prior art, which detail will therefore not be repeated in the disclosure of the present embodiment.)

[0030] The standby current of the entire circuit of a conventional induction trash can under the standby state is about 1.5mA, while standby current of the entire circuit of the induction trash can according to the present invention under the standby state is about 0.067mA~0.092mA, which has been reduced by 22~16 times.

[0031] Figure 2 illustrates a flow diagram of the program of the microcontroller 1 for the standby power-saving method of the induction trash can according to an embodiment of the present invention. After the microcontroller 2 is powered on, the application program disposed in the microcontroller 1 will execute the following steps:

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[0032] Step S101 (either powering on or waking up will trigger this step): carrying on to Step S102 for program initialization if powering on, or carrying on to Step 103 if waking up from sleep.

[0033] Step S102: initializing the program, comprising the following procedures: disposing the port 21 as an output port and into 1 (high level), disposing the port 22 as an output port and into 0 (low level), disposing the port 23 as an input port, disposing the port group A as an output port, controlling the driving circuit not to work, so that the motor will not turn.

[0034] Step S103: disposing the port 21 into 0 (low level), so as to connect the active infrared sensor 1 and the power source Vcc.

[0035] Step S104: delaying for 8ms, for stabilizing the circuit of the active infrared sensor 1.

[0036] Step S105: outputting a pulse signal from port 22 to control the active infrared sensor 1 to emit an infrared pulse signal to the induction area 7.

[0037] Step S106: determining if port 23 has received a reflection signal of the infrared pulse, so as to execute Step S107 if not received or to execute Step S109 if received.

[0038] Step S107: disposing the port 21 into 1 (high level), so as to cut off the power source of the active infrared sensor 1.

[0039] Step S108: executing sleep procedure for 300ms and executing Step S101 after being woken up.

[0040] Step S109: controlling the driving circuit through the output port group A to make the driving circuit 3 drive the motor 4 to rotate forward for 1 second.

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[0041] Step S110: controlling the driving circuit through the output port group A to make the driving circuit 3 stop the motor 4 from rotating and hold it for 3 seconds.

[0042] Step S111: controlling the driving circuit through the output port group A to make the driving circuit 3 drive the motor 4 to rotate backward for 1 second and executing Step S107.

[0043] Figure 3 illustrates a specific circuit diagram for the above embodiment according to the present invention, which is constructed by the components comprising: a dual operational amplifier IC1 (model LM358), an infrared emitting diode D1, an infrared receiving diode D2, a triode Q1, capacitors C0, C1, C2, C5, C6, C13, and resistors R1, R2, R3, R4, R6, R7, R9, R10, W1, W2, R11, R16, and R30. The microcontroller 2 is embodied as model EM78P153 microcontroller. The driving circuit 3 is constructed by the components comprising: PNP triodes Q2 and Q4 (model SS8550D), NPN triodes Q3 and Q5 (model SS8050D), diodes D10 and D11, and resistors R18, R19, R20, and R21. The motor 4 is embodied as model RF-500TB permanent magnet DC motor. The R38 and C9 are utilized for power filtering purpose.

[0044] Referring to Figs. 2 and 3, the working principle includes the following. When the microcontroller 2 is powered on, it will execute Step S101 and turns to Step S102 to conduct program initialization, comprising: disposing the port 21 (the second pin of the microcontroller 2) as an output port and into high level, cutting off the PNP triode 5, such that the power source of the active infrared sensor 1 will be cut off by the PNP triode 5, disposing the port 22 (the fifth pin of the microcontroller 2) as an output port and into high level, cutting off the triode Q1, so that the infrared emitting diode D1 will not emit signal, disposing the port 23 (the eighth pin of the microcontroller 2) as an input port, disposing the port group A (the first, 12th, 13th, and 14th pins of the microcontroller 2) as an output port, wherein the first and 12th pins are in low level, while the 13th and 14th pins are in high level, cutting off the triodes Q2~Q5, such that the driving circuit 3 will not work and the motor will not turn. Then Step S103 will be executed, which includes: disposing the second pin of the microcontroller 2 to low level, activating the PNP triode 5, and filtering power through R38 and C9 and providing power to the active infrared sensor

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1. Next, Step S103 will be executed, which includes: delaying for 8ms to stabilize the circuit of the active infrared sensor 1, so as to carry on executing Step S105: outputting a negative pulse signal through the fifth pin of the microcontroller 2, so that the infrared emitting diode D1 emits a infrared pulse signal to the induction area 7. Then the program will carry on executing Step S106 to determine whether the port 23 of the microcontroller (the eighth pin of the microcontroller 2) has received a reflection signal of the infrared pulse. If the eighth pin of the microcontroller 2 is at low level, which indicates that no reflection signal of the infrared pulse has been received, the program will execute Step S107, while if it is at high level, which indicates that a reflection signal of the infrared pulse has been received, the program will execute Step S109. The working principles regarding the active infrared sensor 1 constructed by the peripheral elements and LM358 are in the prior art, which would not be repeated here. The Step S107 includes disposing the port 21 (the second pin) of the microcontroller to high level, so as to cut off the power supply of the active infrared sensor 1. Then it carries on to Step 108 to execute sleep procedure for 300ms and carries on to Step 101 after wakeup. If there is a reflection signal, Step S109 will be executed, which comprises disposing the first and 14th pins of the port group A of the microcontroller 2 to high level and disposing the 12th and 13th pins of the microcontroller 2 to low level, such that Q2 and Q5 will be connected and Q3 and Q4 will be cut off, rendering the motor 4 to rotate forward for 1 second to open the lid. Then, Step S110 will be executed, which comprises disposing the first, 12th, 13th, and 14th pins of the port group A of the microcontroller 2 to high level, so as to connect the Q3 and Q5 and cut off the Q2 and Q4, such that the motor will lose power, but remain in a braked state (because Q3 and Q5 are connected and the diodes D10 and D11 form the forward and backward circuits of the motor, therefore the lid will not fall easily due to the gravity), wherein the lid opening state will be held for 3 seconds. Next, Step S111 will be executed, which comprises disposing the first and 14th pins of the port group A of the microcontroller 2 to low level and disposing the 12th and 13th pins of the port group A of the microcontroller 2 to high level, such that Q4 and Q3 will be connected and Q2 and Q5 will be cut off, rendering the motor 4 to rotate backward for 1 second to close the lid. Then the program will turn to the Step S107 to return to the standby state.

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[0045] The part of the embodiments that has not been described is the same as prior art.

[0046] One skilled in the art will understand that the embodiment of the present invention as shown in the drawings and described above is exemplary only and not intended to be limiting.

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WHAT IS CLAIMED IS:

1. A power-saving method for induction trash can circuit, wherein the induction trash can circuit comprises an active infrared sensor, a microcontroller, a driving circuit, a motor to open and close the lid, wherein the microcontroller has a sleep function and a watchdog timer, wherein the infrared pulse of the active infrared sensor is controlled by the microcontroller, wherein output port of the active infrared sensor is connected to the microcontroller, comprising the steps of:

controlling the active infrared sensor to emit an infrared pulse signal to the induction area by the microcontroller when the induction trash can circuit is in a standby state; outputting no signal from the active infrared sensor if there is no obstacle in the induction area; having the microcontroller enter a sleep state because it does not receive any output signal from the active infrared sensor; waking up the microcontroller by the watchdog timer disposed therein after the microcontroller has slept for a preset time, so as to have the microcontroller reenter the working state and repeat the above steps under the standby state; outputting a signal from the active infrared sensor if there is an obstacle in the induction area; remaining the microcontroller in the working state when the microcontroller received the output signal from the active infrared sensor, utilizing the driving circuit to drive the motor to rotate forward, delaying for a few seconds after the motor has driven the lid to open, controlling the driving circuit to drive the motor to rotate backward, and reentering the sleep state after the lid is closed.

2. The power-saving method, as recited in claim 1, wherein the power supply of the active infrared sensor is controlled by the microcontroller that the microcontroller will cut off the power supply of the active infrared sensor when the microcontroller enters the sleep state, wherein when the microcontroller is woken up by the watchdog timer when the induction trash can circuit is in a standby state, the microcontroller will first restore the power supply of the active infrared sensor and delay for a preset threshold time for the active infrared sensor to enter a stable working state and then control the active infrared sensor to emit an infrared pulse signal to the induction area, wherein if there is

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no obstacle in the induction area, the active infrared sensor will not output signal and because the microcontroller does not receive output signal from the active infrared sensor, the microcontroller will switch off the power source of the active infrared sensor and reenter the sleep state, wherein after a preset time of sleeping, the watchdog timer disposed in the microcontroller will wake up the microcontroller and turn it back into the working state, wherein the induction trash can circuit under the standby state will repeat the above procedure.

3. The power-saving method, as recited in any of claims 1-2, wherein the preset time is between 100ms and 500ms.

4. The power-saving method, as recited in any of claims -2, wherein the preset threshold time is between 2ms and 50ms.

5. The power-saving method, as recited in any of claims 1-2, wherein the induction area is above the induction window that is located on the front can edge of the trash can.

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Induction Trash Can Circuit Standby Power-saving Method

ABSTRACT OF THE DISCLOSURE

The present invention relates to an induction trash can circuit standby power-saving method. An induction trash can circuit is provided. The induction trash can circuit comprises an active infrared sensor, a microcontroller, a driving circuit and a motor for controlling the opening and closing of a lid. The power-saving method is achieved through the following manners that: in a standby state, the microcontroller controls the active infrared sensor to emit an infrared pulse signal to an induction area; if no obstacle exit in the induction area, the active infrared sensor outputs no signals, the program of the microcontroller immediately enters a sleep state; after the program of the microcontroller sleeps for a period of time, a watchdog timer in the microcontroller wakes up the microcomputer controller to make the microcontroller re-enter a working state; and if the microcontroller is in a standby state, the above process is repeated. With the induction trash can circuit standby power-saving method of the invention adopted, the standby current of the induction trash can be greatly reduced, the service life of a battery can be improved, an excellent power-saving effect can be achieved, the use cost of a user is reduced, and pollution caused by used batteries can be decreased.

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EKO v. Nine Stars, IPR2025-01369

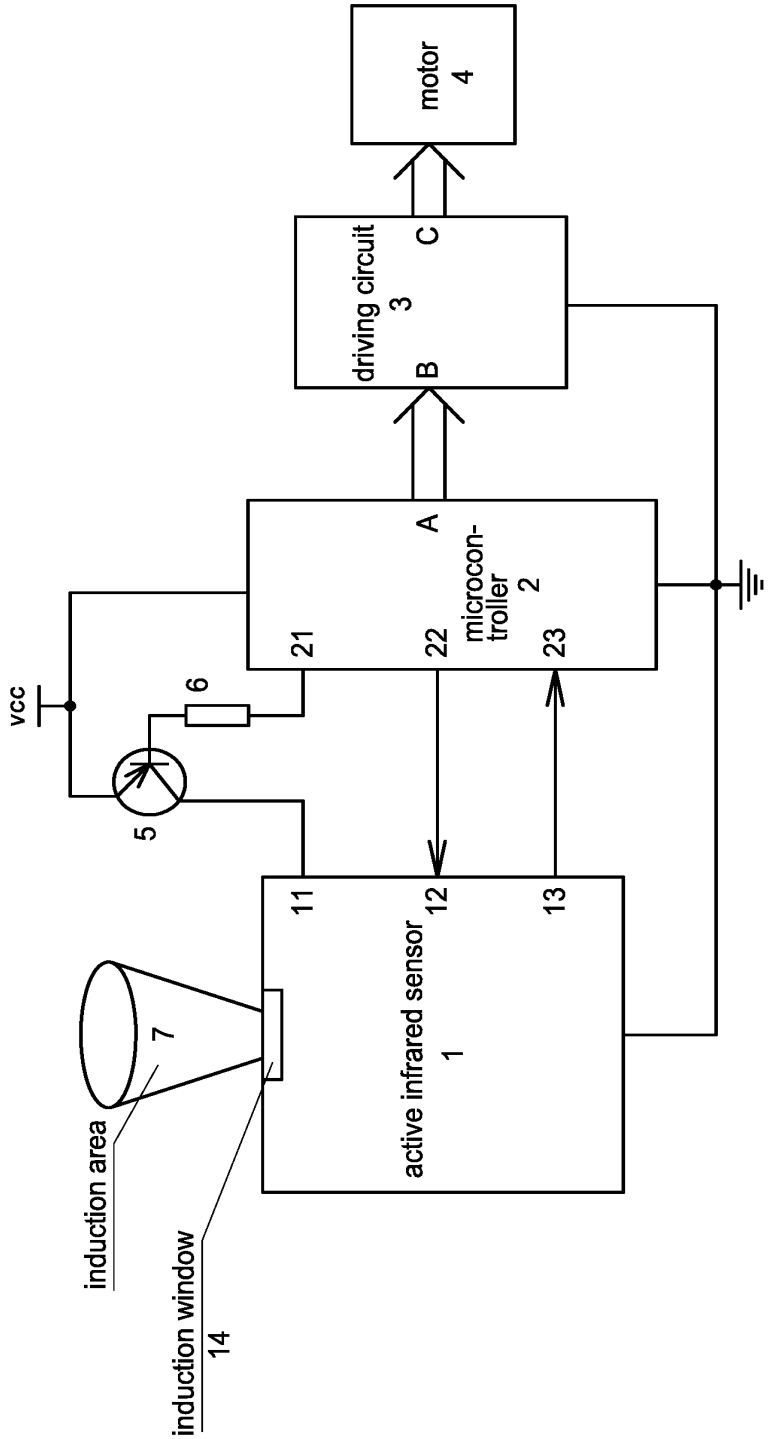

motor
4
driving circuit
3
C
B
A
microcon-
troller
2
21
22
23
vcc
6
5
11
12
13
active infrared sensor
1
7
induction area
induction window
14

Fig.1

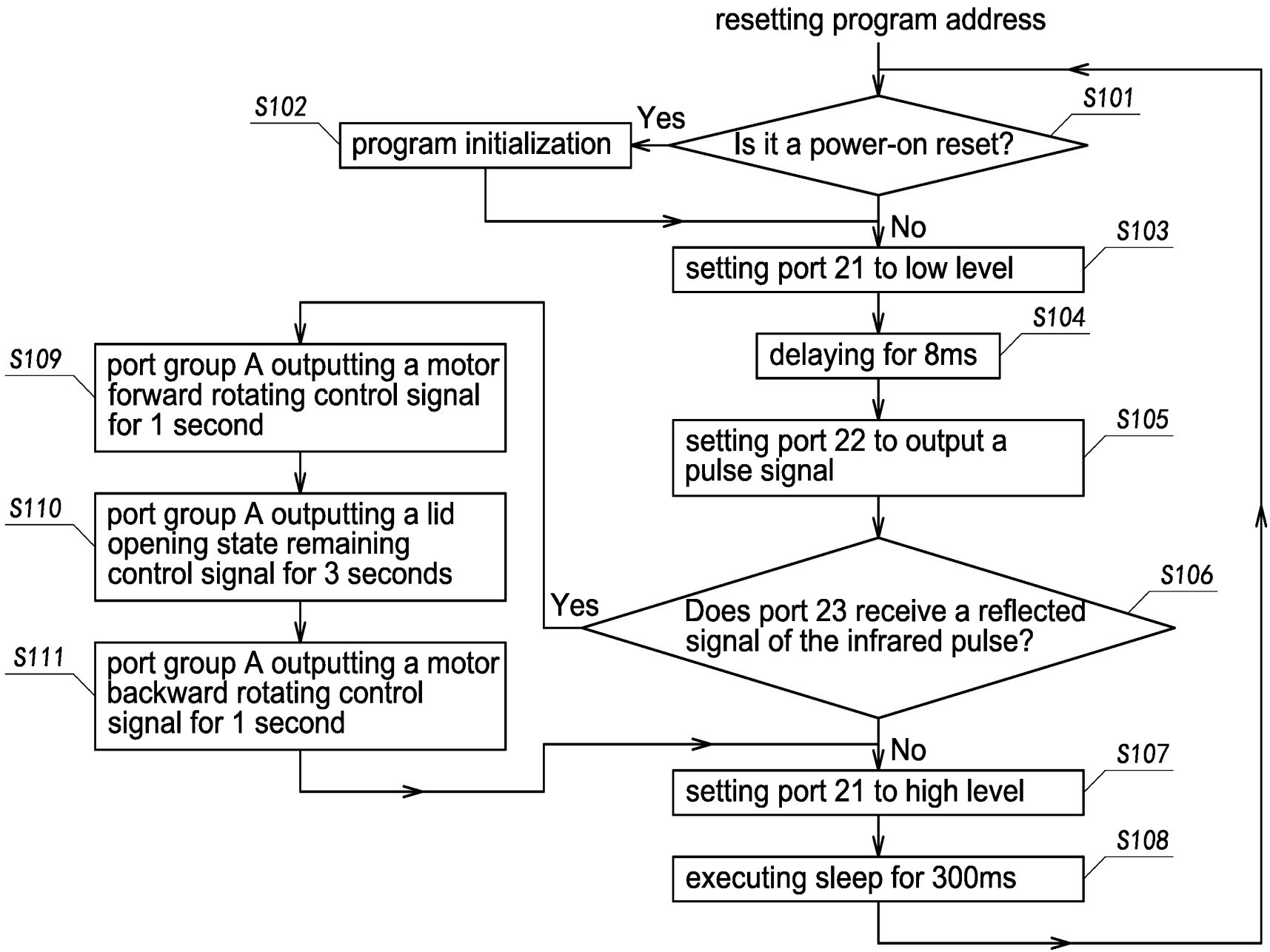


Fig.2

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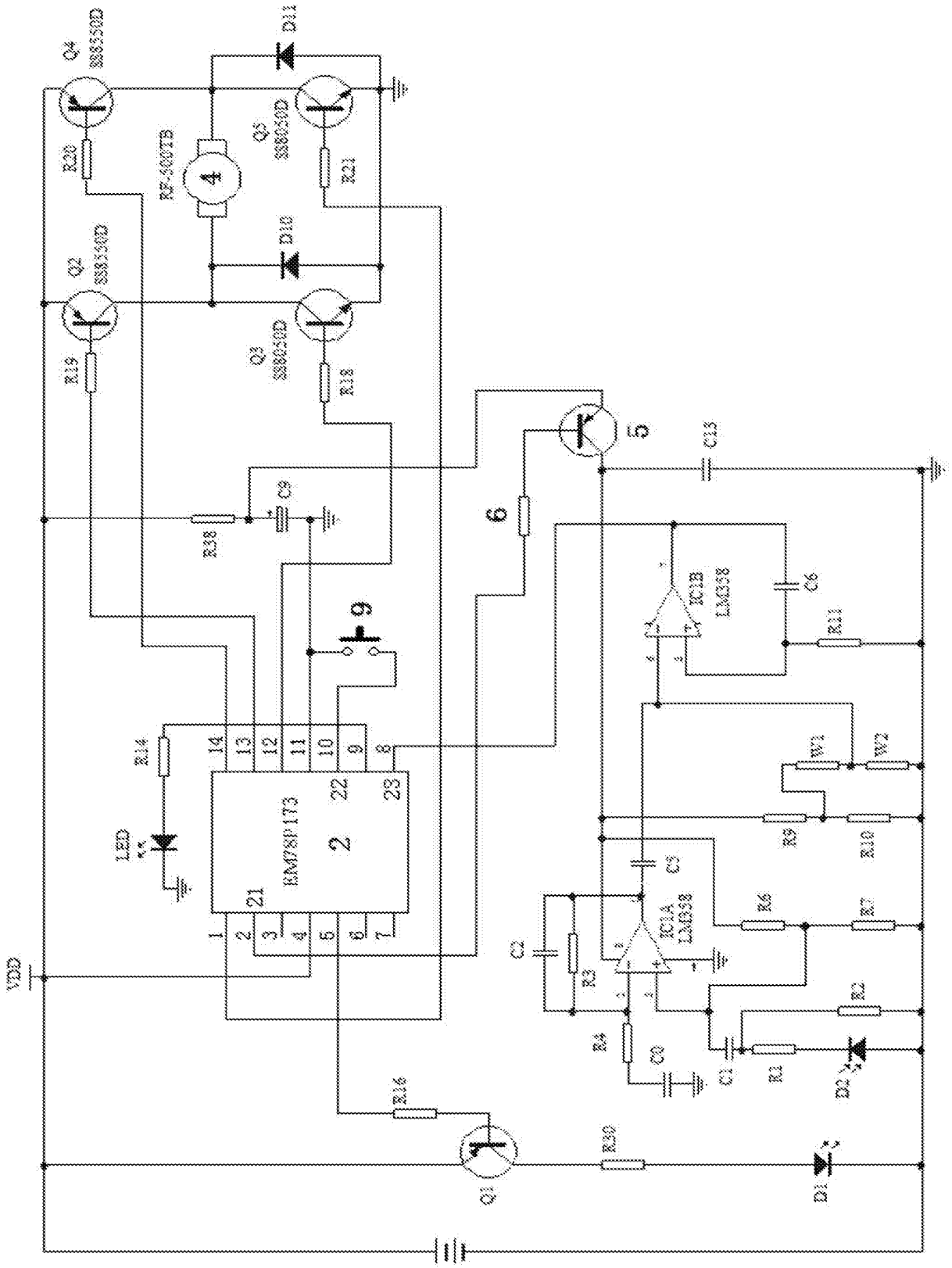

VDD
LED
EMPSNP1T3
IC1A
LM358
IC1B
LM358
Q1
Q2
Q3
Q4
Q5
Q6
D1
D2
D10
D11
RP-400TB
R1
R2
R3
R4
R5
R6
R7
R9
R10
R11
R14
R16
R18
R19
R20
R21
R30
R38
C1
C2
C3
C6
C9
C13
W1
W2

Fig.3

PCT请求书

打印件(原件为电子形式)

0	由受理局填写	
0-1	国际申请号	PCT/CN2017/093119
0-2	国际申请日	2017年 7月 17日 (17.07.2017)
0-3	受理局名称和“PCT国际申请”	RO/CN

0-4	PCT/RO/101表 PCT请求书	
0-4-1	软件版本	CEPCT 版本 1.01.00 MT/FOP 20140331/0.20.5.21
0-5	请求 下列签字人请求按照专利合作条约的规定处理本国际申请	
0-6	申请人指定的受理局	中华人民共和国国家知识产权局 (RO/CN)
0-7	申请人或代理人的档案号	YC2017PCT015
I	发明名称	一种感应垃圾桶电路待机省电方法
II	申请人	
II-1	该人是	申请人 (applicant only)
II-2	是对下列国家的申请人	所有指定国 (all designated States)
II-4zh	名称	福建纳仕达电子股份有限公司
II-4en	Name:	Fujian Nashida Electronic Incorporated Company
II-5zh	地址	中国福建省福州市 闽侯县青口镇新城西路16号3#厂房1-3层宋友铨 350119
II-5en	Address	Song,Youquan Floor 1-3,Factory Building 3#,No. 16 Building of West Xincheng Road, Qingkou,Minhou Fuzhou, Fujian 350119 China
II-6	国籍	中国 CN
II-7	居所	中国 CN
II-8	电话号码	
II-9	传真号码	
II-11	申请人在专利局的登记号	

III-1	申请人和/或发明人	
III-1-1	该人是	发明人 (inventor only)
III-1-3	对下列国家的发明人	
III-1-4 zh	姓名:	王 昕
III-1-4 en	Name (LAST, First):	WANG, Xin
III-1-5 zh	地址	中国福建省福州市 闽侯县青口镇新城西路16号3#厂房1-3层王昕 350119
III-1-5 en	Address	Wang,Xin Floor 1-3,Factory Building 3#,No. 16 Building of West Fuzhou, Fujian 350119 China
III-2	申请人和/或发明人	
III-2-1	该人是	发明人 (inventor only)
III-2-3	对下列国家的发明人	
III-2-4 zh	姓名:	陈 江群
III-2-4 en	Name (LAST, First):	CHEN, Jiangqun
III-2-5 zh	地址	中国福建省福州市 闽侯县青口镇新城西路16号3#厂房1-3层陈江群 350119
III-2-5 en	Address	CHEN,Jiangqun Floor 1-3,Factory Building 3#,No. 16 Building of West Fuzhou, Fujian 350119 China
III-3	申请人和/或发明人	
III-3-1	该人是	发明人 (inventor only)
III-3-3	对下列国家的发明人	
III-3-4 zh	姓名:	林 洲
III-3-4 en	Name (LAST, First):	LIN, Zhou
III-3-5 zh	地址	中国福建省福州市 闽侯县青口镇新城西路16号3#厂房1-3层林洲 350119
III-3-5 en	Address	LIN,Zhou Floor 1-3,Factory Building 3#,No. 16 Building of West Fuzhou, Fujian 350119 China

PCT请求书

打印件(原件为电子形式)

IV-1	**代理人,共同代表或通信地址**	
	下列人员被委托/已经被委托为代表申请人在主管国际单位办理事务的	代理人 (agent)
IV-1-1zh	名称	福州元创专利商标代理有限公司
IV-1-1en	Name:	FUZHOU YUANCHUANG PATENT AND TRADEMARK AGENT LTD.
IV-1-2zh	地址	中国福建省福州市 晋安区东二环泰禾广场SOHO 9号楼5A 416-419 室蔡学俊 350011
IV-1-2en	Address:	Cai Xuejun Room 416-419, Floor 5A, No.9 Building of SOHO in Taihe square of East second ring, Jin An district Fuzhou, Fujian 350011 China
IV-1-3	电话号码	0591-83270420
IV-1-4	传真号码	0591-83270425
IV-1-5	电子邮址	ycpct@fzpm.cn
IV-1-5(a)	电子邮件授权 授权受理局、国际检索单位、国际局和国际初步审查单位，如果其愿意，使用本电子邮件地址发送有关本国际申请的通知书：	作为随后纸件通知书的预送本
IV-1-6	代理人登记号	35100
V	**国家的指定**	
V-1	**根据细则4.9(a)，提交本请求书即为，指定在国际申请日受PCT约束的所有成员国，以要求获得可以获得的所有保护类型，适用情况下，要求获得地区专利和国家专利。**	
V-2	**V-2栏只可用于（不可悔改地）排除对有关国家的指定，如果本国际申请在提交时或者在根据细则26之二.1的后续程序中，第VI栏包含有对在该有关国家提出的在先国家申请的优先权要求，以避免被要求优先权的该在先国家申请因国家法律而停止效力。**	
VI-1	**要求在先国家申请的优先权**	
VI-1-1	申请日	2017年 4月 07日 (07.04.2017)
VI-1-2	号码	2017102238431
VI-1-3	国家	中国 CN
VI-2	**优先权文件请求** 请受理局准备并向国际局送交上述在先申请中标号如下的在先申请的证明副本:	VI-1
VI-3	**援引加入 :** 如果条约11（1）(iii)（d）或（e）规定的国际申请的某一项目，或者细则20.5(a)规定的说明书，权利要求书或附图的某一部分不包含在本国际申请中，但是全部包含在一个在先申请中，并且在受理局首次收到条约11（1）(iii)规定的一个或多个项目之日要求了该在先申请的优先权，则该项目或该部分可以依据细则20.6确认，为细则20.6的目的援引加入到该国际申请中。	

PCT请求书

打印件(原件为电子形式)

VII-1	选定的国际检索单位	中华人民共和国国家知识产权局 (ISA/CN)	
VIII	声明	声明数目	
VIII-1	关于发明人身份的声明	–	
VIII-2	关于申请人在国际申请日有权申请和被授予专利的声明	–	
VIII-3	关于申请人在国际申请日有权要求在先申请的优先权的说明	–	
VIII-4	发明人资格声明(仅为指定美国目的)	–	
VIII-5	关于不影响新颖性的公开或缺乏新颖性的例外的声明	–	
IX	清单	页数	附以电子文档
IX-1	请求书(包括声明页)	4	✓
IX-2	说明书	8	✓
IX-3	权利要求	2	✓
IX-4	摘要	1	✓
IX-5	附图	2	✓
IX-7	共计	17	
	附件	附以纸件	附以电子文档
IX-8	费用计算页	–	✓
IX-9	单独委托书原件	–	✓
IX-18	PCT-SAFE 物理载体	–	–
IX-20	应与摘要一起公布的附图图号	1	
IX-21	国际申请所用语言	中文	
X-1	申请人，代理人或共同代表的签字	/福州元创专利商标代理有限公司/	
X-1-1	名称	福州元创专利商标代理有限公司	
X-1-2	签字人姓名	福州元创专利商标代理有限公司	
X-1-3	还要注明此人是以什么名义签字的	代理人	

由受理局填写

10-1	据称的国际申请文件的实际收到日期	2017年 7月 17日 (17.07.2017)
10-2	附图:	
10-2-1	收到	
10-2-2	未收到	
10-3	由于随后在期限内收到补充国际申请的文件或附图,更改的实际收到日期	
10-4	在期限内收到根据PCT第11(2)条所进行的改正的日期	
10-5	国际检索单位	ISA/CN
10-6	检索本的传送推迟到缴纳检索费后	

由国际局填写

11-1	国际局收到登记本的日期	

证　明

本证明之附件是向本局提交的下列专利申请文件副本。

申　　请　　号：201710223843.1

申　请　类　型：发明专利

发明 创造 名称：一种感应垃圾桶电路待机省电方法

申　　请　　日：2017.04.07

申　　请　　人：福建纳仕达电子股份有限公司

发明人或设计人：王昕、陈江群、林洲

局长

申长雨

2017 年 08 月 04 日

2017102238431

权 利 要 求 书

1. 一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，其特征在于：所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

2. 根据权利要求 1 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

3. 根据权利要求 1 或 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述预设时间未 100ms~500ms 之间。

4. 根据权利要求 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述预设阈值时间未 2ms~50ms 之间。

5. 根据权利要求 1 或 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述的感应区位于垃圾桶前桶沿的感应窗口上方。

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2017102238431

说 明 书

一种感应垃圾桶电路待机省电方法

技术领域

[0001] 本发明涉及一种感应垃圾桶待机电路省电方法。

背景技术

[0002] 现有技术的感应翻盖垃圾桶，绝大部分采用主动式红外感应电路，同时采用一次性电池供电，由于感应翻盖垃圾桶的耗电由两部分组成，第一部分为待机耗电量（桶盖不动时）；第二部分为动作耗电量（桶盖运动时），每天总耗电量=每天待机耗电量+每天动作耗电量。其中每天待机耗电量=待机电流×24 小时，动作耗电量=动作平均电流×动作时间×每天使用的次数。每天待机耗电量是由待机电流决定，每天的动作耗电量与动作平均电流、动作时间和每天使用次数成正比。例如：感应翻盖垃圾桶整体电路的待机电流为 1.5mA，每天的待机耗电量=1.5mA×24 小时=36mAh（毫安时），感应翻盖垃圾桶的动作平均电流一般在 200mA，开关盖时间各为 1S，按每天使用 20 次计算，那么每天的动作耗电量=200 mA×2 秒÷3600×20 次=2.2mAh，每天总耗电量=每天待机耗电量+每天动作耗电量=36mAh+2.2mAh=38.2mAh，如使用碳性高功率 5 号电池容量为 480mAh，只能使用 480÷38.2≈13 天；如使用 5 号碱性电池容量为 1400mAh，只能使用 1400÷38.2≈37 天，从以上计算分析，每天的待机耗电量远大于每天动作耗电量，所以要想降低感应翻盖垃圾桶的耗电，主要是要想办法降低待机时的电流。

发明内容

[0003] 本发明的目的在于提供一种感应垃圾桶电路待机省电方法，该方法大幅度降低了感应垃圾桶电路的待机电流，提高电池使用寿命，达到很好的节电效果，减少了客户的使用产本，减低了废旧电池对环境的污染。

[0004] 为实现上述目的，本发明的技术方案是：一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内

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部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

[0005] 在本发明一实施例中，所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

[0006] 在本发明一实施例中，所述预设时间未 100ms~500ms 之间。

[0007] 在本发明一实施例中，所述预设阈值时间未 2ms~50ms 之间。

[0008] 在本发明一实施例中，所述的感应区位于垃圾桶前桶沿的感应窗口上方。

[0009] 相较于现有技术，本发明具有以下有益效果：本发明方法大幅度降低了感应垃圾桶电路的待机电流，提高电池使用寿命，达到很好的节电效果，减少了客户的使用产本，减低了废旧电池对环境的污染。

附图说明

[0010] 图 1 为图 1 是一种感应垃圾桶电路的待机省电方法电路框图。

[0011] 图 2 是一种感应垃圾桶电路的待机省电方法程序框图。

[0012] 图 3 是一种感应垃圾桶电路的待机省电方法具体电路图。

[0013] 图中：

1-主动式红外线感应器、 11-主动式红外线感应器的电源端、12-主动式红外线感应器的红外线脉冲发射控制端、13-主动式红外线感应器的信号输出端、14-感应窗口、2-微电脑控制器、21-微电脑控制器控制主动式红外线感应器电源的输出端口、22-微电脑控制器控制主动式红外线感应器向感应区发射红外线脉冲信号的输出端口、23-微电脑控制器接收主动式红外线感应器输出信号的输入端口、A-微电脑控制器控制驱动电路的输出端口组、 3-驱动电

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路、B-驱动电路控制端口组、C-驱动电路输出端口组、4-电机、5-PNP 型三级管、6-限流电阻、7-感应区。

具体实施方式

[0014] 下面结合附图，对本发明的技术方案进行具体说明。

[0015] 本发明的一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

[0016] 所谓主动式红外线感应器原理是感应器主动向感应区发射红外线探测信号，红外线遇到障碍被反射回来，反射回来的微弱信号被感应器放大和比较后输出。主动式红外线感应器的耗电电流一般在 0.03 mA ~0.6mA，视主动式红外线感应器内部使用的芯片的耗电指标而定，一般芯片耗电指标越低价格就越高。微电脑控制器在工作状态下耗电电流一般在 1.3 mA 左右，微电脑控制器在睡眠状态下为 1μA（可以忽略不计），如果不采用上述技术情况下，感应垃圾桶整体电路的待机电流在 1.33mA~1.90mA 之间；如果采用本专利上述的技术，在待机状态下：微电脑控制器工作时间设置为 5mS(发射和接收红外线脉冲的时间), 睡眠时间设置为 300mS(看门狗定时器 WDT 唤醒的时间),微电脑控制器的平均耗电电流≈5÷300×1.3 mA≈0.022 mA，感应垃圾桶整体电路的待机电流在 0.052mA~0.622mA 之间，每天待机耗电量约为 1.248 mAh ~14.93mAh，按每天使用 20 次计算，每天的动作耗电量=2.2 毫安时，每天总耗电量 3.45 mAh ~17.13 mAh，如使用碳性高功率 5 号电池容量为 480mAh，理论上约能使用 139 天~28 天，如果主动式红外线感应器内部使用的芯片采用低功耗高价格的情况下，139 天完全能满足实际要求；如使用 5 号碱性电池容量为 1400mAh，理论上约能使用 405 天~81 天。

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[0017] 进一步的，本发明的省电方法还可采用如下方式：

所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

[0018] 这样做的目的是可以让主动式红外线感应器处于间歇工作状态，进一步降低感应垃圾桶整体电路的待机电流，同时也可以使主动式红外线感应器内部使用的芯片的耗电指标不需要太高，降低芯片的价格，从而降低整体产品的成本。按本专利上述方案的技术，微电脑控制器从睡眠中被看门狗定时器 WDT 唤醒，首先打开主动式红外线感应器的电源，然后延时一段极短的时间为 8ms，微电脑控制器工作时间设置为 13mS，睡眠时间设置为 300mS，主动式红外线感应器的平均耗电电流=[（0.03 mA -0.01 mA）~(0.6mA-0.01mA）)×13÷300+0.01mA≈0.011 mA ~0.036 mA（上式中的 0.01mA 为红外线脉冲发射的平均电流），微电脑控制器的平均耗电电流≈13÷300×1.3 mA≈0.056 mA，感应垃圾桶整体电路的待机电流在 0.067mA~0.092mA 之间，每天待机耗电量约为 1.61 mAh ~2.21mAh，按每天使用 20 次计算，每天的动作耗电量=2.2 毫安时，每天总耗电量 3.81 mAh ~4.41mAh，如使用碳性高功率 5 号电池容量为 480mAh，能使用 126 天~109 天，从上述理论计算结果，即使主动式红外线感应器内部使用的芯片采用耗电指标大（价格低），也能使用 109 天，完全能满足实际要求；如使用 5 号碱性电池容量为 1400mAh，理论上约能使用 367 天~317 天。

[0019] 所述预设时间未 100ms~500ms 之间。所述预设阈值时间未 2ms~50ms 之间。

[0020] 所述的感应区位于垃圾桶前桶沿的感应窗口上方。

[0021] 以下为本发明的具体实施过程。

[0022] 参见图 1 和图 2，本实施例包括主动式红外线感应器 1、微电脑控制器（即微控制器）2、驱动电路 3、电机 4、PNP 型三级管 5 和限流电阻 6。微电脑控制器 2 采用具有睡眠功能和带有看门狗定时器 WDT 的芯片，主动式红外线感应器 1 电源端 11 的供电，由微电脑控制器 2 通过输出端口 21 控制，当微电脑控制器 2 输出端口 21 为高电平时，通过电阻 6 使 PNP 型三级管 5 的基极为高电平，基极不导通，三级管 5 截止，切断主动式红外线感应

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器 1 的电源；当微电脑控制器 2 输出端口 21 为低电平时，通过限流电阻 6 使三级管 5 基极导通，三级管 5 饱和导通，主动式红外线感应器 1 的电源端 11 接通电源。在待机状态下：微电脑控制器 2 从睡眠中被看门狗定时器 WDT 唤醒，首先置输出端口 21 为低电平，使主动式红外线感应器 1 接通电源 Vcc，然后延时 8ms 的时间，让主动式红外线感应器 1 电路稳定后，再通过输出端口 22 控制主动式红外线感应器 1 向感应区 7 发射一个红外线脉冲信号，此时如感应区 7 内没有障碍物，主动式红外线感应器 1 的输出端口 13 为低电平（无输出信号），微电脑控制器 2 的输入端口 23 也为低电平（无信号输入），微电脑控制器 2 的输入端口 23 接收不到红外线脉冲反射信号，微电脑控制器 2 的程序即刻将端口 21 置为高电平，通过电阻 6 和三极管 5 切断主动式红外线感应器 1 的电源，然后再进入到睡眠状态，在睡眠 300ms 时间后，微电脑控制器 2 内部的看门狗定时器 WDT 唤醒微电脑控制器 2 重新进入工作状态，在待机状态下重复上述过程；如感应区 7 有障碍物，主动式红外线感应器 1 的输出端口 13 为高电平（有输出信号），微电脑控制器 2 的输入端口 23 也为高电平（有信号输入），微电脑控制器 2 的输入端口 23 接收到红外线脉冲反射信号，微电脑控制器 2 的程序在接收到主动式红外线感应器 1 的输出信号后，微电脑控制器 2 就不进入睡眠状态，保持工作状态，微电脑控制器 1 通过输出端口组 A 控制驱动电路输入端口组 B，使驱动电路 3 通过输出端口组 C 带动电机 4 正向转，电机 4 带动桶盖开启并延时 3 秒后，微电脑控制器 1 再控制驱动电路 3 带动电机 4 反向转，将桶盖关闭后微电脑控制器 2 再进入待机状态（驱动电路的控制为现有技术，本实施例不在详细说明）。

[0023] 在待机状态下，传统技术的感应翻盖垃圾桶整体电路的待机电流约为 1.5mA，采用本专利技术的感应翻盖垃圾桶整体电路的待机电流控制在 0.067mA~0.092mA 之间，待机电流约减少了 22~16 倍。

[0024] 本实施例的一种感应垃圾桶电路待机省电方法，其微电脑控制器 1 的程序框图见图 2。电路上电后，植入在微电脑控制器 1 内的应用程序从步骤 S101 开始执行，执行程序的各步骤内容如下所述：

S101 步骤：上电或唤醒复位都执行该步骤，如果是上电就执行 S102 进行程序初始化；如果是从睡眠中被唤醒就执行 S103。

[0025] S102 步骤：程序初始化，将端口 21 设置为输出口，且置为 1（高电平）；将端口 22 设置为输出口，且置为 0（低电平）；将端口 23 设置为输入口；将端口组 A 设置为输出口，且控制驱动电路不工作，电机不转动。

[0026] S103 步骤：置端口 21 为 0（低电平），使主动式红外线感应器 1 接通电源 Vcc。

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[0027] S104 步骤：延时 8ms 的时间，让主动式红外线感应器 1 电路稳定。

[0028] S105 步骤：端口 22 输出一脉冲信号，控制主动式红外线感应器 1 向感应区 7 发射一个红外线脉冲信号。

[0029] S106 步骤：判断端口 23 是否接收到红外线脉冲反射信号，如果没接收到执行 S107 步骤；如果有接收到执行 S109 步骤。

[0030] S107 步骤：置端口 21 为 1（高电平），切断主动式红外线感应器 1 的电源。

[0031] S108 步骤：行睡眠程序 300mS，唤醒后执行 S101 步骤。

[0032] S109 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 带动电机 4 正向转 1 秒钟。

[0033] S110 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 让电机 4 停止转动，并保持 3 秒钟。

[0034] S111 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 带动电机 4 反向转 1 秒钟，然后执行 S107 步骤。

[0035] 本实施例的具体电路图见图 3，主动式红外线感应器 1，由双运算放大器 IC1(型号为 LM358)、红外发射管 D1，红外接收管 D2，三极管 Q1，电容 C0、C1、C2、C5、C6、C13，电阻 R1、R2、R3、R4、R6、R7、R9、R10、W1、W2、R11、R16、R30 构成。微电脑控制器 2 采用型号 EM78P153。驱动电路 3，由 PNP 三极管 Q2 和 Q4（型号为 SS8550D），NPN 三极管 Q3 和 Q5（型号为 SS8050D），二极管 D10 和 D11，电阻 R18、R19、R20 和 R21 构成。电机 4 选用永磁直流电机型号 RF-500TB。R38 和 C9 电源滤波用。

[0036] 参见图 2 和图 3，工作原理叙述如下：微电脑控制器 2 上电时执行 S101 步骤，然后转入 S102 步骤进行程序初始化，将端口 21（微电脑控制器 2 第 2 脚）设置为输出口，且置为高电平，PNP 三极管 5 截止，主动式红外线感应器 1 的电源被 PNP 三极管 5 切断；将端口 22（微电脑控制器 2 第 5 脚）设置为输出口，且置为高电平，三极管 Q1 截止，红外发射管 D1 不发射信号；将端口 23（微电脑控制器 2 第 8 脚）设置为输入口；将端口组 A（微电脑控制器 2 的第 1、12、13、14 脚）设置为输出口，且置 1 脚和 12 脚为低电平，13 脚和 14 脚为高电平，三级管 Q2~Q5 截止，驱动电路 3 不工作，电机不转动。然后程序执行 S103 步骤，将微电脑控制器 2 第 2 脚且置为低电平，PNP 三极管 5 导通，主动式红外线感应器 1 的电源通过 R38 和 C9 滤波后得电，然后程序执行 S104 步骤延时 8mS 使主动式红外线感应器 1 的电路稳定后，再执行 S105 步骤，微电脑控制器 2 第 5 脚输出一负脉冲信号，红外发射管 D1 向感应区 7 发射红外线脉冲信号，然后程序执行 S106 步骤判断微电脑控制器端口 23（微电脑控制器 2 第 8 脚）是否接收到红外线脉冲反射信号，如果微电脑控制器 2 第 8 脚为

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低电平（无反射信号）就执行 S107 步骤；如果为高电平（有反射信号）就执行 S109 步骤（关于 LM358 和外围元件构成的主动式红外线感应器 1 的原理为公知技术这里不再叙述）。在 S107 步骤里置微电脑控制器端口 21（第 2 脚）为高电平，切断主动式红外线感应器 1 的电源，然后执行 S108 步骤睡眠程序运行 300mS，唤醒后执行 S101 步骤。在有反射信号时执行 S109 步骤，微电脑控制器 2 置端口组 A 中的第 1 脚和第 14 脚为高电平，置第 12 脚和 13 脚为低电平，致使 Q2 和 Q5 导通，Q3 和 Q4 截止，电机 4 正向转动 1 秒将桶盖打开。然后执行 S110 步骤微电脑控制器 2 置端口组 A 中的第 13 脚、第 14 脚、第 1 脚和 12 脚为高电平，致使 Q3 和 Q5 导通，Q2 和 Q4 截止，此时电机不得电，但处于制动状态（由于 Q3 和 Q5 导通和二级管 D10 和 D11 构成电机两端正反向通路，桶盖不容易因重力掉落下来），开盖状态保持 3 秒。然后执行 S111 步骤微电脑控制器 2 置端口组 A 中的第 1 脚和第 14 脚为低电平，置第 12 脚和 13 脚为高电平，致使 Q4 和 Q3 导通，Q2 和 Q5 截止，电机 4 反向转动 1 秒将桶盖关闭，然后程序转入 S107 步骤回到待机状态。

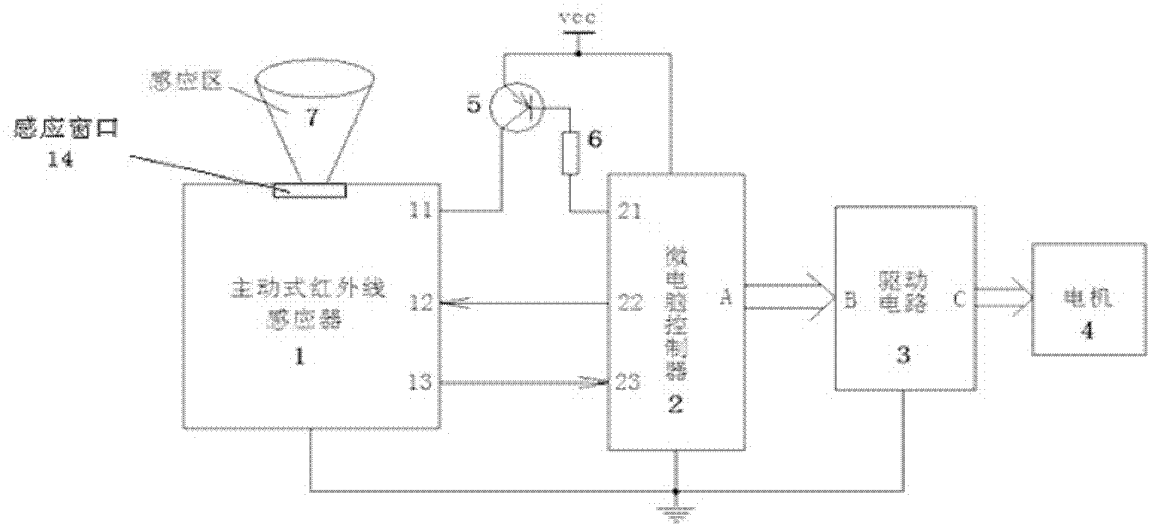
[0037] 本实例未描述部分与现有技术相同。

[0038] 以上是本发明的较佳实施例，凡依本发明技术方案所作的改变，所产生的功能作用未超出本发明技术方案的范围时，均属于本发明的保护范围。

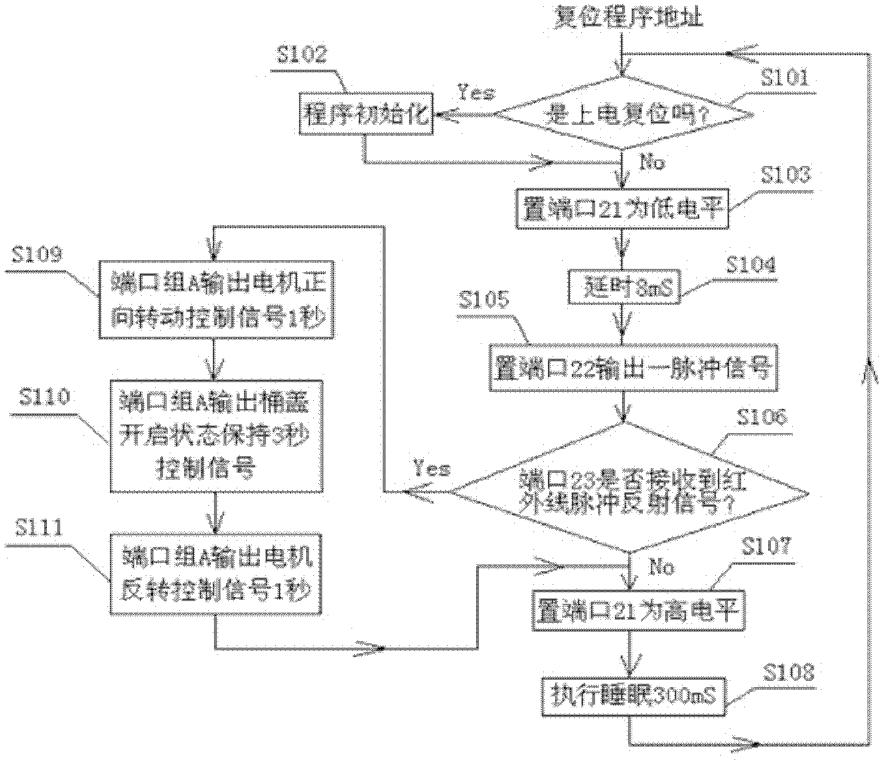
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说 明 书 附 图



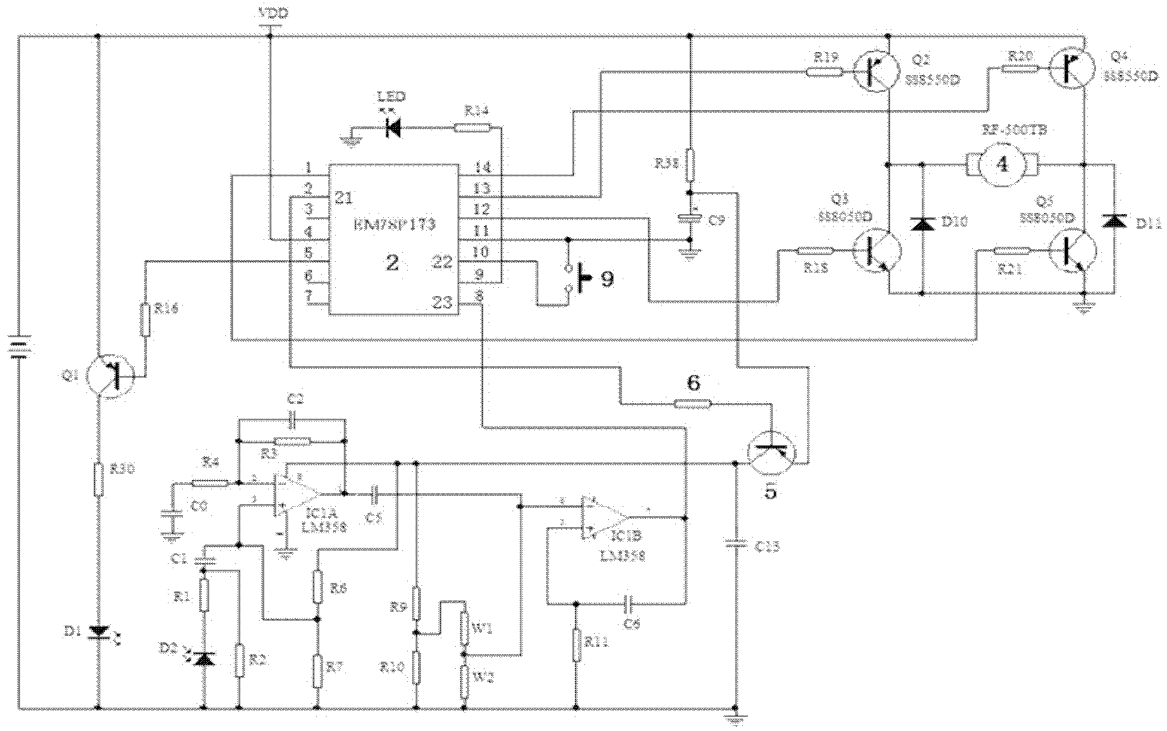
【图号】 图 1



【图号】 图 2

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说 明 书 附 图



【图号】 图 3

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PCT请求书

打印件(原件为电子形式)

0	由受理局填写	
0-1	国际申请号	
0-2	国际申请日	
0-3	受理局名称和"PCT国际申请"	

0-4	**PCT/RO/101表 PCT请求书**	
0-4-1	软件版本	**CEPCT** 版本 **1.01.00 MT/FOP 20140331/0.20.5.21**
0-5	请求 下列签字人请求按照专利合作条约的规定处理本国际申请	
0-6	申请人指定的受理局	中华人民共和国国家知识产权局 **(RO/CN)**
0-7	申请人或代理人的档案号	**YC2017PCT015**
I	发明名称	一种感应垃圾桶电路待机省电方法
II	申请人	
II-1	该人是	申请人 **(applicant only)**
II-2	是对下列国家的申请人	所有指定国 **(all designated States)**
II-4zh	名称	福建纳仕达电子股份有限公司
II-4en	Name:	**Fujian Nashida Electronic Incorporated Company**
II-5zh	地址	中国福建省福州市 闽侯县青口镇新城西路**16**号**3#**厂房**1-3**层宋友铨 **350119**
II-5en	Address	**Song,Youquan** **Floor 1-3,Factory Building 3#,No. 16 Building of West Xincheng Road, Qingkou,Minhou** **Fuzhou, Fujian 350119** **China**
II-6	国籍	中国 **CN**
II-7	居所	中国 **CN**
II-8	电话号码	
II-9	传真号码	
II-11	申请人在专利局的登记号	

III-1	申请人和/或发明人	
III-1-1	该人是	发明人 (inventor only)
III-1-3	对下列国家的发明人	
III-1-4zh	姓名:	王 昕
III-1-4en	Name (LAST, First):	**WANG, Xin**
III-1-5zh	地址	中国福建省福州市 闽侯县青口镇新城西路16号3#厂房1-3层王昕 350119
III-1-5en	Address	**Wang,Xin** **Floor 1-3,Factory Building 3#,No. 16 Building of West Xincheng Road, Qingkou,Minhou** **Fuzhou, Fujian 350119 China**
III-2	申请人和/或发明人	
III-2-1	该人是	发明人 (inventor only)
III-2-3	对下列国家的发明人	
III-2-4zh	姓名:	陈 江群
III-2-4en	Name (LAST, First):	**CHEN, Jiangqun**
III-2-5zh	地址	中国福建省福州市 闽侯县青口镇新城西路16号3#厂房1-3层陈江群 350119
III-2-5en	Address	**CHEN,Jiangqun** **Floor 1-3,Factory Building 3#,No. 16 Building of West Xincheng Road, Qingkou,Minhou** **Fuzhou, Fujian 350119 China**
III-3	申请人和/或发明人	
III-3-1	该人是	发明人 (inventor only)
III-3-3	对下列国家的发明人	
III-3-4zh	姓名:	林 洲
III-3-4en	Name (LAST, First):	**LIN, Zhou**
III-3-5zh	地址	中国福建省福州市 闽侯县青口镇新城西路16号3#厂房1-3层林洲 350119
III-3-5en	Address	**LIN,Zhou** **Floor 1-3,Factory Building 3#,No. 16 Building of West Xincheng Road, Qingkou,Minhou** **Fuzhou, Fujian 350119 China**

替换页

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IV-1	代理人,共同代表或通信地址 下列人员被委托/已经被委托为代表申请人在主管国际单位办理事务的	代理人 **(agent)**
IV-1-1zh	名称	福州元创专利商标代理有限公司
IV-1-1en	Name:	**FUZHOU YUANCHUANG PATENT AND TRADEMARK AGENT LTD.**
IV-1-2zh	地址	中国福建省福州市 晋安区东二环泰禾广场**SOHO 9**号楼**5A 416-419** 室蔡学俊 **350011**
IV-1-2en	Address:	**Cai Xuejun** **Room 416-419，Floor 5A, No.9 Building of SOHO in Taihe square of East second ring, Jin An district** **Fuzhou, Fujian 350011** **China**
IV-1-3	电话号码	**0591-83270420**
IV-1-4	传真号码	**0591-83270425**
IV-1-5	电子邮址	**ycpct@fzpm.cn**
IV-1-5(a)	电子邮件授权 授权受理局、国际检索单位、国际局和国际初步审查单位，如果其愿意，使用本电子邮件地址发送有关本国际申请的通知书：	作为随后纸件通知书的预送本
IV-1-6	代理人登记号	**35100**
V	国家的指定	
V-1	根据细则**4.9(a)**，提交本请求书即为，指定在国际申请日受**PCT**约束的所有成员国,以要求获得可以获得的所有保护类型，适用情况下，要求获得地区专利和国家专利。	
V-2	**V-2**栏只可用于（不可悔改地）排除对有关国家的指定，如果本国际申请在提交时或者在根据细则**26**之二**.1**的后续程序中，第**VI**栏包含有对在该有关国家提出的在先国家申请的优先权要求，以避免被要求优先权的该在先国家申请因国家法律而停止效力。	
VI-1	要求在先国家申请的优先权	
VI-1-1	申请日	**2017**年 **4**月 **07**日 **(07.04.2017)**
VI-1-2	号码	**2017102238431**
VI-1-3	国家	中国 **CN**
VI-2	优先权文件请求 请受理局准备并向国际局送交上述在先申请中标号如下的在先申请的证明副本:	**VI-1**
VI-3	援引加入： 如果条约11（1）(**&#65533;**)（d）或（e）规定的国际申请的某一项目，或者细则20.5(a)规定的说明书，权利要求书或附图的某一部分不包含在本国际申请中，但是全部包含在一个在先申请中，并且在受理局首次收到条约11（1）(**&#65533;**)规定的一个或多个项目之日要求了该在先申请的优先权，则该项目或该部分可以依据细则20.6确认，为细则20.6的目的援引加入到该国际申请中。	
VII-1	选定的国际检索单位	中华人民共和国国家知识产权局 **(ISA/CN)**

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VIII	声明	声明数目	
VIII-1	关于发明人身份的声明	-	
VIII-2	关于申请人在国际申请日有权申请和被授予专利的声明	-	
VIII-3	关于申请人在国际申请日有权要求在先申请的优先权的说明	-	
VIII-4	发明人资格声明(仅为指定美国目的)	-	
VIII-5	关于不影响新颖性的公开或缺乏新颖性的例外的声明	-	
IX	清单	页数	附以电子文档
IX-1	请求书(包括声明页)	**5**	✓
IX-2	说明书	**5**	✓
IX-3	权利要求	**0**	-
IX-4	摘要	**0**	-
IX-5	附图	**0**	-
IX-7	共计	**10**	
	附件	附以纸件	附以电子文档
IX-8	费用计算页	-	✓
IX-9	单独委托书原件	-	✓
IX-10	总委托书原件	-	✓
IX-11	总委托书副本	-	✓
IX-13(A)	恢复优先权的说明	-	✓
IX-14	国际申请被译成	-	✓
IX-15	有关保藏的微生物或其他生物材料的单独说明	-	✓
IX-16	根据细则13之三，仅为国际检索的目的提交的电子形式序列表(附件C/ST.25 文本文件)	-	✓
IX-18	PCT-SAFE 物理载体	-	-
IX-19	其他	格式转换前的文件声明（行政规程第**706**条）：这是本国际申请在转换成用于提交的电子文件格式前完整准确的副本。	✓
IX-19	其他	**other**	✓
IX-20	应与摘要一起公布的附图图号	**1**	
IX-21	国际申请所用语言	中文	
X-1	申请人，代理人或共同代表的签字		
X-1-1	姓名:		
X-1-2	签字人姓名		
X-1-3	还要注明此人是以什么名义签字的		

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由受理局填写

10-1	据称的国际申请文件的实际收到日期	
10-2	附图:	
10-2-1	收到	
10-2-2	未收到	
10-3	由于随后在期限内收到补充国际申请的文件或附图,更改的实际收到日期	
10-4	在期限内收到根据**PCT**第**11(2)**条所进行的改正的日期	
10-5	国际检索单位	**ISA/CN**
10-6	检索本的传送推迟到缴纳检索费后	

由国际局填写

11-1	国际局收到登记本的日期	

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国 际 局

(43) 国际公布日
2018 年 10 月 11 日 (11.10.2018)

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(22) 国际申请日: 2017 年 7 月 17 日 (17.07.2017)

(25) 申请语言: 中文

(26) 公布语言: 中文

(30) 优先权:
201710223843.1 2017年4月7日 (07.04.2017) CN

(71) 申请人: 福建纳仕达电子股份有限公司 (FUJIAN NASHIDA ELECTRONIC INCORPORATED COMPANY) [CN/CN]; 中国福建省福州市闽侯县青口镇新城西路16号3#厂房1-3层宋友铨, Fujian 350119 (CN)。

(72) 发明人: 王昕(WANG, Xin); 中国福建省福州市闽侯县青口镇新城西路16号3#厂房1-3层, Fujian 350119 (CN)。 陈江群(CHEN, Jiangqun); 中国福建省福州市闽侯县青口镇新城西路16号3#厂房1-3层, Fujian 350119 (CN)。 林洲(LIN, Zhou); 中国福建省福州市闽侯县青口镇新城西路16号3#厂房1-3层, Fujian 350119 (CN)。

(74) 代理人: 福州元创专利商标代理有限公司 (FUZHOU YUANCHUANG PATENT AND TRADEMARK AGENT LTD.); 中国福建省福州市晋安区东二环泰禾广场SOHO9号楼5A416-419室蔡学俊, Fujian 350011 (CN)。

(81) 指定国(除另有指明，要求每一种可提供的国家保护): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB,

(54) **Title:** POWER-SAVING STANDBY METHOD FOR WASTE BIN SENSING CIRCUIT

(54) **发明名称:** 一种感应垃圾桶电路待机省电方法

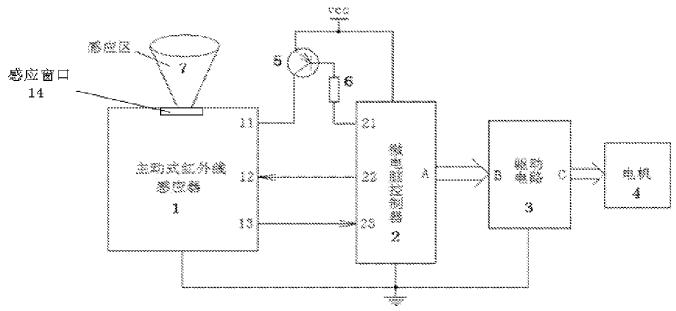


图 1

1 Active infrared sensor
2 Micro-computer controller
3 Drive circuit
4 Motor
7 Sensing region
14 Sensing window

(57) **Abstract:** A power-saving standby method for a waste bin sensing circuit. A waste bin sensing circuit is provided, and includes an active infrared sensor (1), a micro-controller (2), a drive circuit (3), and a motor (4) configured to control a bin lid to open or close, wherein the micro-controller (2) has a hibernation function and watchdog timer, infrared pulse transmission of the active infrared sensor (1) is controlled by the micro-controller (2), and an output end of the active infrared sensor (1) is connected to the micro-controller (2). The power saving method is implemented such that when being in a standby state: the micro-controller (2) controls the active infrared sensor (1) to transmit an infrared pulse signal to a sensing region; if no obstacle is in the sensing region, then the active infrared sensor (1) outputs no signal, and a process of the micro-controller (2) enters into a hibernation state immediately; after remaining in the hibernation state for a period of time, the watchdog timer in the micro-controller (2) wakes up the micro-controller (2) to re-enter an operation state; and the aforementioned procedures are repeated in the standby state. The method significantly reduces a standby current

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GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW。

(84) 指定国(除另有指明，要求每一种可提供的地区保护)：ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG)。

本国际公布：

— 包括国际检索报告(条约第21条(3))。

of the waste bin sensing circuit, improves the battery runtime, provides a superior power saving effect, lowers costs of a customer, and mitigates environment pollution caused by waste batteries.

(57) 摘要：一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线感应器（1）、微控制器（2）、驱动电路（3）、用于控制桶盖开关的电机（4），微控制器（2）具有睡眠功能和看门狗定时器，主动式红外线感应器（1）的红外线脉冲发射由微控制器（2）控制，主动式红外线感应器（1）的输出端连接至微控制器（2），省电方法实现方式为，在待机状态下：由微控制器（2）控制主动式红外线感应器（1）向感应区发射一个红外线脉冲信号，如感应区没有障碍物，主动式红外线感应器（1）无输出信号，微控制器（2）程序即刻就进入到睡眠状态，在睡眠一段时间后，微控制器（2）内部的看门狗定时器唤醒微控制器（2）重新进入工作状态，在待机状态下重复上述过程。本方法大幅度降低了感应垃圾桶电路的待机电流，提高电池使用寿命，达到很好的节电效果，减少了客户的使用成本，降低了废旧电池对环境的污染。

一种感应垃圾桶电路待机省电方法

技术领域

本发明涉及一种感应垃圾桶待机电路省电方法。

背景技术

现有技术的感应翻盖垃圾桶，绝大部分采用主动式红外感应电路，同时采用一次性电池供电，由于感应翻盖垃圾桶的耗电由两部分组成，第一部分为待机耗电量（桶盖不动时）；第二部分为动作耗电量（桶盖运动时），每天总耗电量=每天待机耗电量+每天动作耗电量。其中每天待机耗电量=待机电流×24 小时，动作耗电量=动作平均电流×动作时间×每天使用的次数。每天待机耗电量是由待机电流决定，每天的动作耗电量与动作平均电流、动作时间和每天使用次数成正比。例如：感应翻盖垃圾桶整体电路的待机电流为 1.5mA，每天的待机耗电量=1.5mA×24 小时=36mAh（毫安时），感应翻盖垃圾桶的动作平均电流一般在200mA，开关盖时间各为 1S，按每天使用 20 次计算，那么每天的动作耗电量=200mA×2 秒÷3600×20 次=2.2mAh，每天总耗电量=每天待机耗电量+每天动作耗电量=36mAh+2.2mAh=38.2mAh，如使用碳性高功率 5 号电池容量为 480mAh，只能使用 480÷38.2≈13 天；如使用 5 号碱性电池容量为 1400mAh，只能使用1400÷38.2≈37 天，从以上计算分析，每天的待机耗电量远大于每天动作耗电量，所以要想降低感应翻盖垃圾桶的耗电，主要是要想办法降低待机时的电流。

发明内容

本发明的目的在于提供一种感应垃圾桶电路待机省电方法，该方法大幅度降低了感应垃圾桶电路的待机电流，提高电池使用寿命，达到很好的节电效果，减少了客户的使用产本，减低了废旧电池对环境的污染。

为实现上述目的，本发明的技术方案是：一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输

Petitioner Ex 1002, p. 93
EKO v. Nine Stars, IPR2025-01369

出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

在本发明一实施例中，所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

在本发明一实施例中，所述预设时间未 100ms~500ms 之间。

在本发明一实施例中，所述预设阈值时间未 2ms~50ms 之间。

在本发明一实施例中，所述的感应区位于垃圾桶前桶沿的感应窗口上方。

相较于现有技术，本发明具有以下有益效果：本发明方法大幅度降低了感应垃圾桶电路的待机电流，提高电池使用寿命，达到很好的节电效果，减少了客户的使用产本，减低了废旧电池对环境的污染。

附图说明

图 1 为图 1 是一种感应垃圾桶电路的待机省电方法电路框图。

图 2 是一种感应垃圾桶电路的待机省电方法程序框图。

图 3 是一种感应垃圾桶电路的待机省电方法具体电路图。

图中：

1-主动式红外线感应器、 11-主动式红外线感应器的电源端、12-主动式红外

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线感应器的红外线脉冲发射控制端、13-主动式红外线感应器的信号输出端、14-感应窗口、2-微电脑控制器、21-微电脑控制器控制主动式红外线感应器电源的输出端口、22-微电脑控制器控制主动式红外线感应器向感应区发射红外线脉冲信号的输出端口、23-微电脑控制器接收主动式红外线感应器输出信号的输入端口、A-微电脑控制器控制驱动电路的输出端口组、 3-驱动电路、B-驱动电路控制端口组、C-驱动电路输出端口组、4-电机、5-PNP 型三级管、6-限流电阻、7-感应区。

具体实施方式

下面结合附图，对本发明的技术方案进行具体说明。

本发明的一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

所谓主动式红外线感应器原理是感应器主动向感应区发射红外线探测信号，红外线遇到障碍被反射回来，反射回来的微弱信号被感应器放大和比较后输出。主动式红外线感应器的耗电电流一般在 0.03 mA ~0.6mA，视主动式红外线感应器内部使用的芯片的耗电指标而定，一般芯片耗电指标越低价格就越高。微电脑控制器在工作状态下耗电电流一般在 1.3 mA 左右，微电脑控制器在睡眠状态下为 1μA（可以忽略不计），如果不采用上述技术情况下，感应垃圾桶整体电路的

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待机电流在 1.33mA~1.90mA 之间；如果采用本专利上述的技术，在待机状态下：微电脑控制器工作时间设置为 5mS(发射和接收红外线脉冲的时间), 睡眠时间设置为 300mS(看门狗定时器 WDT 唤醒的时间),微电脑控制器的平均耗电电流≈5÷300×1.3 mA≈0.022 mA，感应垃圾桶整体电路的待机电流在 0.052mA~0.622mA 之间，每天待机耗电量约为 1.248 mAh ~14.93mAh，按每天使用 20 次计算，每天的动作耗电量=2.2 毫安时，每天总耗电量 3.45 mAh ~17.13 mAh，如使用碳性高功率 5 号电池容量为 480mAh，理论上约能使用 139 天~28 天，如果主动式红外线感应器内部使用的芯片采用低功耗高价格的情况下，139 天完全能满足实际要求；如使用 5 号碱性电池容量为 1400mAh，理论上约能使用 405 天~81 天。

进一步的，本发明的省电方法还可采用如下方式：

所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

这样做的目的是可以让主动式红外线感应器处于间歇工作状态，进一步降低感应垃圾桶整体电路的待机电流，同时也可以使主动式红外线感应器内部使用的芯片的耗电指标不需要太高，降低芯片的价格，从而降低整体产品的成本。按本专利上述方案的技术，微电脑控制器从睡眠中被看门狗定时器 WDT 唤醒，首先打开主动式红外线感应器的电源，然后延时一段极短的时间为 8ms，微电脑控制器工作时间设置为 13mS，睡眠时间设置为 300mS，主动式红外线感应器的平均耗电电流=[（0.03 mA -0.01 mA）~(0.6mA-0.01mA）)×13÷300+0.01mA≈0.011 mA ~0.036 mA（上式中的 0.01mA 为红外线脉冲发射的平均电流），微电脑控制

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器的平均耗电电流≈13÷300×1.3 mA≈0.056 mA，感应垃圾桶整体电路的待机电流在 0.067mA~0.092mA 之间，每天待机耗电量约为 1.61 mAh ~2.21mAh，按每天使用 20 次计算，每天的动作耗电量=2.2 毫安时，每天总耗电量 3.81 mAh ~4.41mAh，如使用碳性高功率 5 号电池容量为 480mAh，能使用 126 天~109 天，从上述理论计算结果，即使主动式红外线感应器内部使用的芯片采用耗电指标大（价格低），也能使用 109 天，完全能满足实际要求；如使用 5 号碱性电池容量为 1400mAh，理论上约能使用 367 天~317 天。

所述预设时间未 100ms~500ms 之间。所述预设阈值时间未 2ms~50ms 之间。

所述的感应区位于垃圾桶前桶沿的感应窗口上方。

以下为本发明的具体实施过程。

参见图 1 和图 2，本实施例包括主动式红外线感应器 1、微电脑控制器（即微控制器）2、驱动电路 3、电机 4、PNP 型三级管 5 和限流电阻 6。微电脑控制器 2 采用具有睡眠功能和带有看门狗定时器 WDT 的芯片，主动式红外线感应器 1 电源端 11 的供电，由微电脑控制器 2 通过输出端口 21 控制，当微电脑控制器 2 输出端口 21 为高电平时，通过电阻 6 使 PNP 型三级管 5 的基极为高电平，基极不导通，三级管 5 截止，切断主动式红外线感应器 1 的电源；当微电脑控制器 2 输出端口 21 为低电平时，通过限流电阻 6 使三级管 5 基极导通，三级管 5 饱和导通，主动式红外线感应器 1 的电源端 11 接通电源。在待机状态下：微电脑控制器 2 从睡眠中被看门狗定时器 WDT 唤醒，首先置输出端口 21 为低电平，使主动式红外线感应器 1 接通电源 Vcc，然后延时 8ms 的时间，让主动式红外线感应器 1 电路稳定后，再通过输出端口 22 控制主动式红外线感应器 1 向感应区 7 发射一个红外线脉冲信号，此时如感应区 7 内没有障碍物，主动式红外线感应器 1 的输出端口 13 为低电平（无输出信号），微电脑控制器 2 的输入端口 23 也为低电平（无信号输入），微电脑控制器 2 的输入端口 23 接收不到红外线脉冲反射信号，微电脑控制器 2 的程序即刻将端口 21 置为高电平，通过电阻 6 和三极管 5 切断主动式红外线感应器 1 的电源，然后再进入到睡眠状态，在睡眠 300ms 时间后，微电脑控制器 2 内部的看门狗定时器 WDT 唤醒微电脑控制器 2 重新进入工作状态，在待机状态下重复上述过程；如感应区 7 有障碍物，主动式红外线感应器 1 的输出端口 13 为高电平（有输出信号），微电脑控制器 2 的输入端口

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23 也为高电平（有信号输入），微电脑控制器 2 的输入端口 23 接收到红外线脉冲反射信号，微电脑控制器 2 的程序在接收到主动式红外线感应器 1 的输出信号后，微电脑控制器 2 就不进入睡眠状态，保持工作状态，微电脑控制器 1 通过输出端口组 A 控制驱动电路输入端口组 B，使驱动电路 3 通过输出端口组 C 带动电机 4 正向转，电机 4 带动桶盖开启并延时 3 秒后，微电脑控制器 1 再控制驱动电路 3 带动电机 4 反向转，将桶盖关闭后微电脑控制器 2 再进入待机状态（驱动电路的控制为现有技术，本实施例不在详细说明）。

在待机状态下，传统技术的感应翻盖垃圾桶整体电路的待机电流约为 1.5mA，采用本专利技术的感应翻盖垃圾桶整体电路的待机电流控制在 0.067mA~0.092mA 之间，待机电流约减少了 22~16 倍。

本实施例的一种感应垃圾桶电路待机省电方法，其微电脑控制器 1 的程序框图见图 2。电路上电后，植入在微电脑控制器 1 内的应用程序从步骤 S101 开始执行，执行程序的各步骤内容如下所述：

S101 步骤：上电或唤醒复位都执行该步骤，如果是上电就执行 S102 进行程序初始化；如果是从睡眠中被唤醒就执行 S103。

S102 步骤：程序初始化，将端口 21 设置为输出口，且置为 1（高电平）；将端口 22 设置为输出口，且置为 0（低电平）；将端口 23 设置为输入口；将端口组 A 设置为输出口，且控制驱动电路不工作，电机不转动。

S103 步骤：置端口 21 为 0（低电平），使主动式红外线感应器 1 接通电源 Vcc。

S104 步骤：延时 8ms 的时间，让主动式红外线感应器 1 电路稳定。

S105 步骤：端口 22 输出一脉冲信号，控制主动式红外线感应器 1 向感应区 7 发射一个红外线脉冲信号。

S106 步骤：判断端口 23 是否接收到红外线脉冲反射信号，如果没接收到执行 S107 步骤；如果有接收到执行 S109 步骤。

S107 步骤：置端口 21 为 1（高电平），切断主动式红外线感应器 1 的电源。

S108 步骤：行睡眠程序 300mS，唤醒后执行 S101 步骤。

S109 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 带动电机 4 正向转 1 秒钟。

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S110 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 让电机 4 停止转动，并保持 3 秒钟。

S111 步骤：输出端口组 A 控制驱动电路，使驱动电路 3 带动电机 4 反向转 1 秒钟，然后执行 S107 步骤。

本实施例的具体电路图见图 3，主动式红外线感应器 1，由双运算放大器 IC1(型号为 LM358)、红外发射管 D1，红外接收管 D2，三极管 Q1，电容 C0、C1、C2、C5、C6、C13，电阻 R1、R2、R3、R4、R6、R7、R9、R10、W1、W2、R11、R16、R30 构成。微电脑控制器 2 采用型号 EM78P153。驱动电路 3，由 PNP 三极管 Q2 和 Q4（型号为 SS8550D），NPN 三极管 Q3 和 Q5（型号为 SS8050D），二极管 D10 和 D11，电阻 R18、R19、R20 和 R21 构成。电机 4 选用永磁直流电机型号 RF-500TB。R38 和 C9 电源滤波用。

参见图 2 和图 3，工作原理叙述如下：微电脑控制器 2 上电时执行 S101 步骤，然后转入 S102 步骤进行程序初始化，将端口 21（微电脑控制器 2 第 2 脚）设置为输出口，且置为高电平，PNP 三极管 5 截止，主动式红外线感应器 1 的电源被 PNP 三极管 5 切断；将端口 22（微电脑控制器 2 第 5 脚）设置为输出口，且置为高电平，三极管 Q1 截止，红外发射管 D1 不发射信号；将端口 23（微电脑控制器 2 第 8 脚）设置为输入口；将端口组 A（微电脑控制器 2 的第 1、12、13、14 脚）设置为输出口，且置 1 脚和 12 脚为低电平，13 脚和 14 脚为高电平，三级管 Q2~Q5 截止，驱动电路 3 不工作，电机不转动。然后程序执行 S103 步骤，将微电脑控制器 2 第 2 脚且置为低电平，PNP 三极管 5 导通，主动式红外线感应器 1 的电源通过 R38 和 C9 滤波后得电，然后程序执行 S104 步骤延时 8mS 使主动式红外线感应器 1 的电路稳定后，再执行 S105 步骤，微电脑控制器 2 第 5 脚输出一负脉冲信号，红外发射管 D1 向感应区 7 发射红外线脉冲信号，然后程序执行 S106 步骤判断微电脑控制器端口 23（微电脑控制器 2 第 8 脚）是否接收到红外线脉冲反射信号，如果微电脑控制器 2 第 8 脚为低电平（无反射信号）就执行 S107 步骤；如果为高电平（有反射信号）就执行 S109 步骤（关于 LM358 和外围元件构成的主动式红外线感应器 1 的原理为公知技术这里不再叙述）。在 S107 步骤里置微电脑控制器端口 21（第 2 脚）为高电平，切断主动式红外线感应器 1 的电源，然后执行 S108 步骤睡眠程序运行 300mS，唤醒后执行 S101 步

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骤。在有反射信号时执行 S109 步骤，微电脑控制器 2 置端口组 A 中的第 1 脚和第 14 脚为高电平，置第 12 脚和 13 脚为低电平，致使 Q2 和 Q5 导通，Q3 和 Q4 截止，电机 4 正向转动 1 秒将桶盖打开。然后执行 S110 步骤微电脑控制器 2 置端口组 A 中的第 13 脚、第 14 脚、第 1 脚和 12 脚为高电平，致使 Q3 和 Q5 导通，Q2 和 Q4 截止，此时电机不得电，但处于制动状态（由于 Q3 和 Q5 导通和二级管 D10 和 D11 构成电机两端正反向通路，桶盖不容易因重力掉落下来），开盖状态保持 3 秒。然后执行 S111 步骤微电脑控制器 2 置端口组 A 中的第 1 脚和第 14 脚为低电平，置第 12 脚和 13 脚为高电平，致使 Q4 和 Q3 导通，Q2 和 Q5 截止，电机 4 反向转动 1 秒将桶盖关闭，然后程序转入 S107 步骤回到待机状态。

本实例未描述部分与现有技术相同。

以上是本发明的较佳实施例，凡依本发明技术方案所作的改变，所产生的功能作用未超出本发明技术方案的范围时，均属于本发明的保护范围。

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权利要求书

1．一种感应垃圾桶电路待机省电方法，提供一感应垃圾桶电路，包括主动式红外线传感器、微控制器、驱动电路、用于控制桶盖开关的电机，其特征在于：所述微控制器具有睡眠功能和看门狗定时器，所述主动式红外线感应器的红外线脉冲发射由微控制器控制，主动式红外线感应器的输出端连接至微控制器，所述省电方法实现如下：

在感应垃圾桶电路处于待机状态下：由微控制器控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，进入到睡眠状态，在睡眠一预设时间后，微控制器内部的看门狗定时器唤醒微控制器，使得微控制器重新进入工作状态，并在在待机状态下重复上述过程；若感应区有障碍物，主动式红外线感应器输出信号，微控制器由于接收到主动式红外线感应器的输出信号，继续保持工作状态，并通过驱动电路带动电机正转，电机带动桶盖开启并延时几秒后，再控制驱动电路带动电机反转，将桶盖关闭后微控制器再进入睡眠状态。

2．根据权利要求 1 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述主动式红外线感应器的电源供电由所述微控制器控制，在微控制器进入到睡眠状态时，微控制器切断主动式红外线感应器的电源供电；在感应垃圾桶电路处于待机状态下：微控制器从睡眠中被看门狗定时器唤醒，首先打开主动式红外线感应器的电源供电，然后延时一预设阈值时间，让主动式红外线感应器处于稳定工作状态后，再控制主动式红外线感应器向感应区发射一红外线脉冲信号，若感应区没有障碍物，主动式红外线感应器无输出信号，微控制器由于接收不到主动式红外线感应器的输出信号，关闭主动式红外线感应器的电源，然后微控制器再进入到睡眠状态，在睡眠一预设时间后，微电脑控制器内部的看门狗定时器唤醒微控制器重新进入工作状态，在感应垃圾桶电路处于待机状态下重复上述过程。

3．根据权利要求 1 或 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述预设时间未 100ms~500ms 之间。

4．根据权利要求 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述预设阈值时间未 2ms~50ms 之间。

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5．根据权利要求 1 或 2 所述的一种感应垃圾桶电路待机省电方法，其特征在于：所述的感应区位于垃圾桶前桶沿的感应窗口上方。

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EKO v. Nine Stars, IPR2025-01369

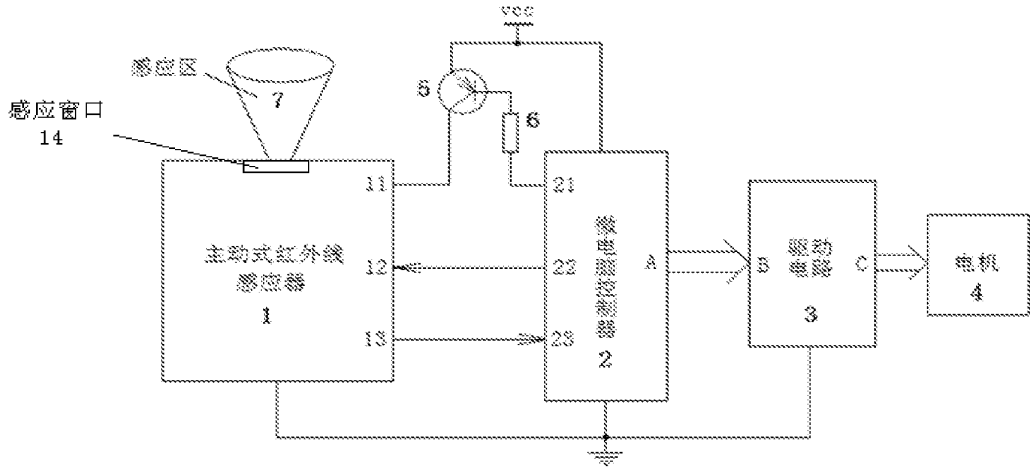


图 1

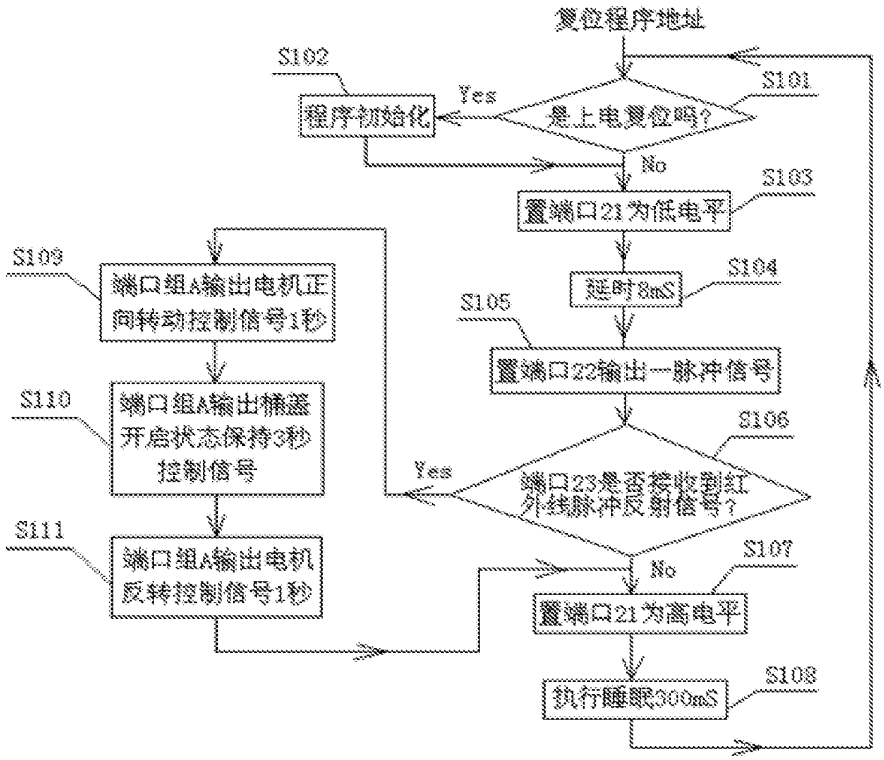


图 2

Petitioner Ex 1002, p. 103
EKO v. Nine Stars, IPR2025-01369

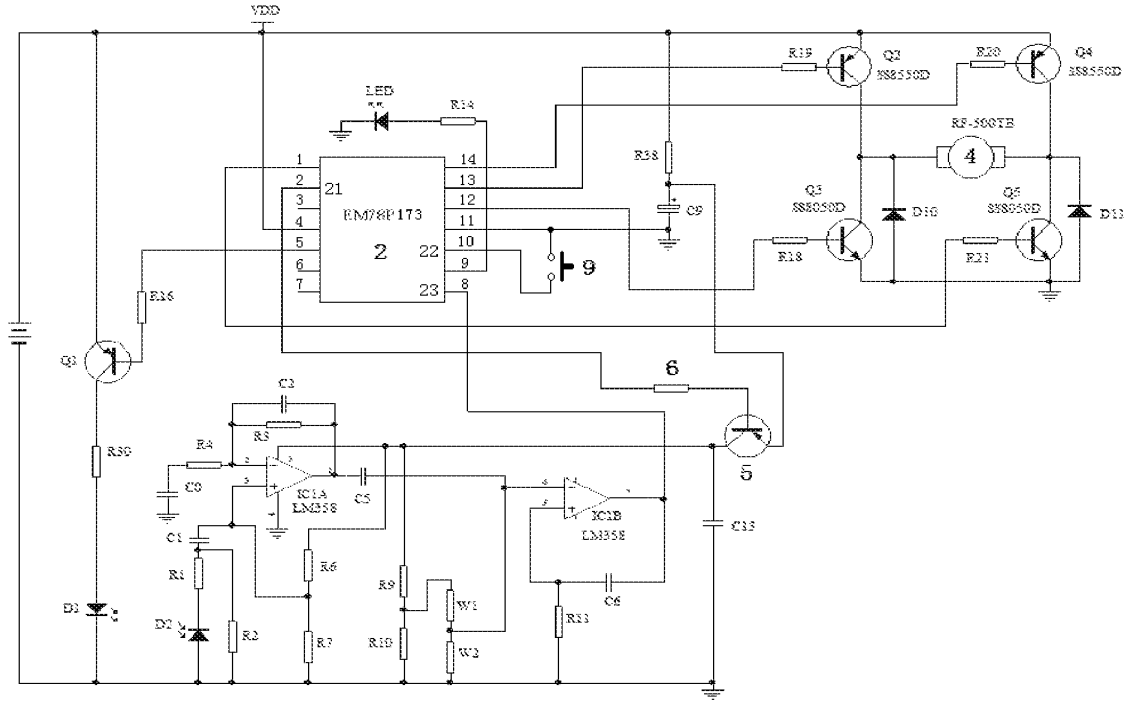


图 3

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EKO v. Nine Stars, IPR2025-01369

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/093119

A. CLASSIFICATION OF SUBJECT MATTER

G05B 19/042 (2006.01) i; B65F 1/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G05B B65F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, WPI, EPODOC, CNKI: 福建纳仕达电子股份有限公司, 王昕, 垃圾桶, 红外, 待机, 感应, 传感, 感测, 检测, 看门狗, 定时, 晶振, 唤醒, 睡眠, 休眠, dustbin, detect, sens+, induc+, infrar+, electric+, sav+, watchdog, timer, sleep, state, wake up

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 106886182 A (FUJIAN NINE STARS ELECTRONIC CO., LTD.) 23 June 2017 (23.06.2017), claims 1-5	1-5
Y	CN 103439899 A (ZHEJIANG YUYAO XINYU SANITARY WARE CO., LTD.) 11 December 2013 (11.12.2013), description, paragraphs [0032]-[0037]	1-5
Y	CN 2889965 Y (WANG, Xin et al.) 18 April 2007 (18.04.2007), description, page 3, line 24 to page 7, line 2	1-5
A	CN 203909319 U (CHONGQING DIKUANG TECHNOLOGY CO., LTD.) 29 October 2014 (29.10.2014), entire document	1-5
A	CN 101776872 A (SHEN, Haiqiao) 14 July 2010 (14.07.2010), entire document	1-5
A	CN 203819844 U (NANCHANG HANGKONG UNIVERSITY) 10 September 2014 (10.09.2014), entire document	1-5

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 December 2017	09 January 2018

Name and mailing address of the ISA	Authorized officer
State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	LIU, Jing Telephone No. (86-10) 62413459

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/093119

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 203033276 U (WANG, Xin) 03 July 2013 (03.07.2013), entire document	1-5
A	CN 203094879 U (SHENZHEN GREENSITE ENVIRONMENTAL & ENERGY TECHNOLOGY LTD.) 31 July 2013 (31.07.2013), entire document	1-5
A	JP 2004231237 A (CLEANUP CORP. et al.) 19 August 2004 (19.08.2004), entire document	1-5

Form PCT/ISA /210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/093119

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 106886182 A	23 June 2017	None	
CN 103439899 A	11 December 2013	None	
CN 2889965 Y	18 April 2007	WO 2006097019 A1	21 September 2006
		US 2009057317 A1	05 March 2009
		EP 1918223 A1	07 May 2008
		US 7714527 B2	11 May 2010
CN 203909319 U	29 October 2014	None	
CN 101776872 A	14 July 2010	CN 101776872 B	18 January 2012
CN 203819844 U	10 September 2014	None	
CN 203033276 U	03 July 2013	None	
CN 203094879 U	31 July 2013	None	
JP 2004231237 A	19 August 2004	None	

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国际检索报告

国际申请号
PCT/CN2017/093119

A. 主题的分类

G05B 19/042(2006.01)i; B65F 1/00(2006.01)i

按照国际专利分类(IPC)或者同时按照国家分类和IPC两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

G05B B65F

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用）)

CNPAT,WPI,EPODOC,CNKI: 福建纳仕达电子股份有限公司，王昕，垃圾桶，红外，待机，感应，传感，感测，检测，看门狗，定时，晶振，唤醒，睡眠，休眠，dustbin，detect，sens+，induc+，infrar+，electric+，sav+，watchdog，timer，sleep，state，wake up

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求
PX	CN 106886182 A（福建纳仕达电子股份有限公司）2017年 6月 23日（2017 - 06 - 23） 权利要求1-5	1-5
Y	CN 103439899 A（余姚市心雨洁具有限公司）2013年 12月 11日（2013 - 12 - 11） 说明书第[0032]-[0037]段	1-5
Y	CN 2889965 Y（王昕 等）2007年 4月 18日（2007 - 04 - 18） 说明书第3页第24行-第7页第2行	1-5
A	CN 203909319 U（重庆地矿科技有限公司）2014年 10月 29日（2014 - 10 - 29） 全文	1-5
A	CN 101776872 A（沈海桥）2010年 7月 14日（2010 - 07 - 14） 全文	1-5
A	CN 203819844 U（南昌航空大学）2014年 9月 10日（2014 - 09 - 10） 全文	1-5
A	CN 203033276 U（王昕）2013年 7月 3日（2013 - 07 - 03） 全文	1-5

☑ 其余文件在C栏的续页中列出。

☑ 见同族专利附件。

* 引用文件的具体类型：

“A” 认为不特别相关的表示了现有技术一般状态的文件

“E” 在国际申请日的当天或之后公布的在先申请或专利

“L” 可能对优先权要求构成怀疑的文件，或为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件（如具体说明的）

“O” 涉及口头公开、使用、展览或其他方式公开的文件

“P” 公布日先于国际申请日但迟于所要求的优先权日的文件

“T” 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件

“X” 特别相关的文件，单独考虑该文件，认定要求保护的发明不是新颖的或不具有创造性

“Y” 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性

“&” 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
2017年 12月 18日	2018年 1月 9日
ISA/CN的名称和邮寄地址 中华人民共和国国家知识产权局(ISA/CN) 中国北京市海淀区蓟门桥西土城路6号 100088 传真号 (86-10)62019451	受权官员 刘晶 电话号码 (86-10)62413459

表 PCT/ISA/210（第2页）（2009年7月）

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EKO v. Nine Stars, IPR2025-01369

国际检索报告

国际申请号
PCT/CN2017/093119

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求
A	CN 203094879 U（深圳市格林赛特环保能源科技有限公司）2013年 7月 31日（2013 - 07 - 31） 全文	1-5
A	JP 2004231237 A（CLEANUP CORP. 等）2004年 8月 19日（2004 - 08 - 19） 全文	1-5

Petitioner Ex 1002, p. 109
EKO v. Nine Stars, IPR2025-01369

国际检索报告
关于同族专利的信息

国际申请号
PCT/CN2017/093119

检索报告引用的专利文件			公布日（年/月/日）	同族专利			公布日（年/月/日）
CN	106886182	A	2017年 6月 23日	无			
CN	103439899	A	2013年 12月 11日	无			
CN	2889965	Y	2007年 4月 18日	WO	2006097019	A1	2006年 9月 21日
				US	2009057317	A1	2009年 3月 5日
				EP	1918223	A1	2008年 5月 7日
				US	7714527	B2	2010年 5月 11日
CN	203909319	U	2014年 10月 29日	无			
CN	101776872	A	2010年 7月 14日	CN	101776872	B	2012年 1月 18日
CN	203819844	U	2014年 9月 10日	无			
CN	203033276	U	2013年 7月 3日	无			
CN	203094879	U	2013年 7月 31日	无			
JP	2004231237	A	2004年 8月 19日	无			

表 PCT/ISA/210（同族专利附件）（2009年7月）

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/315,652	01/06/2019		790	USP10302A-NSG	12	1

CONFIRMATION NO. 6872

30265
DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

FILING RECEIPT

OC000000107896732

Date Mailed: 05/03/2019

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Xin WANG, Fuzhou, CHINA;
Jiangqun CHEN, Fuzhou, CHINA;
Zhou LIN, Fuzhou, CHINA;

Applicant(s)

Fujian Nashida Electronic Incorporated Company, Fuzhou, Fujian, CHINA

Assignment For Published Patent Application

Nine Stars Group (U.S.A.) Inc., Pomona, CA
Fujian Nashida Electronic Incorporated Company, Fuzhou,Fujian, CHINA

Power of Attorney: The patent practitioners associated with Customer Number 30265

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/CN2017/093119 07/17/2017

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
CHINA 201710223843.1 04/07/2017

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

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EKO v. Nine Stars, IPR2025-01369

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 05/02/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/315,652**

Projected Publication Date: 08/15/2019

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

Induction Trash Can Circuit Standby Power-saving Method

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: Yes

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

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countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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EKO v. Nine Stars, IPR2025-01369

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/315,652

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	150		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	260		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	380		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	12 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 230 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	790		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

U.S. APPLICATION NO.	FIRST NAMED INVENTOR	ATTY. DOCKET NO.
16/315,652	Xin WANG	USP10302A-NSG

30265
DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

INTERNATIONAL APPLICATION NO.	
PCT/CN2017/093119	
I.A. FILING DATE	PRIORITY DATE
07/17/2017	04/07/2017

CONFIRMATION NO. 6872
371 ACCEPTANCE LETTER

OC00000010789675

Date Mailed: 05/03/2019

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office, in its capacity as a Designated / Elected Office (37 CFR 1.495), has ACCEPTED the above identified international application for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above. A Filing Receipt will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE "FILING DATE or 371(c) DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1) and (c)(2) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN BELOW.** The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363)

01/06/2019
DATE OF RECEIPT OF 35 U.S.C.
371(c)(1) and (c)(2) REQUIREMENTS

The following items have been received:

- Indication of Small Entity Status
- Copy of the International Application filed on 01/06/2019
- English Translation of the IA filed on 01/06/2019
- Copy of the International Search Report filed on 01/06/2019
- Preliminary Amendments filed on 01/06/2019
- Inventor's Oath or Declaration filed on 01/06/2019
- Small Entity Statement filed on 01/06/2019
- Request for Immediate Examination filed on 01/06/2019
- U.S. Basic National Fees filed on 01/06/2019
- Assignee Statement for PGPUB filed on 01/06/2019
- Priority Documents filed on 01/06/2019
- Power of Attorney filed on 01/06/2019
- Authorization to Permit Access filed on 01/06/2019
- Application Data Sheet (37 CFR 1.76) filed on 01/06/2019

Petitioner Ex 1002, p. 116
EKO v. Nine Stars, IPR2025-01369

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

SHELBY J MILLER

Telephone: (571) 272-0384

FORM PCT/DO/EO/903 (371 Acceptance Notice)

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET

Substitute for Form PTO-1360
(For use with Form PTO/SB/06)

Application Number	Filing Date
16315652	

Applicant(s) Xin WANG

* May be used for additional claims or amendments

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT	
	Indep	Depend	Indep	Depend	Indep	Depend
1	1					
2		1				
3		2				
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Total Indep	1		1		0	
Total Depend	7	↵	11	↵	0	↵
Total Claims	8		12		0	

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	Indep	Depend	Indep	Depend	Indep	Depend
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UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/315,652	01/06/2019	Xin WANG	USP10302A-NSG

CONFIRMATION NO. 6872

30265
DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

PUBLICATION NOTICE

OC000000110427658

Title: Induction Trash Can Circuit Standby Power-saving Method

Publication No.US-2019-0250579-A1
Publication Date:08/15/2019

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/315,652	01/06/2019	Xin WANG	USP10302A-NSG	6872

30265 7590 05/18/2020

DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

EXAMINER	
SURYAWANSHI, SURESH	

ART UNIT	PAPER NUMBER
2116	

MAIL DATE	DELIVERY MODE
05/18/2020	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 16/315,652	Applicant(s) WANG et al.	
	Examiner SURESH K SURYAWANSHI	Art Unit 2116	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 1/6/19.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 6-17 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 6-17 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☑ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 1/6/19 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☑ All b)☐ Some** c)☐ None of the:

1.☑ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

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Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

1. Claims 6-17 are presented for examination.

Specification

2. The abstract of the disclosure is objected to because it contains more than 150 words. Correction is required. See MPEP § 608.01(b).

Claim Objections

3. Claims 8 and 9 are objected to because of the following informalities: duplicate claims. Appropriate correction is required.

4. Claims 10 and 11 are objected to because of the following informalities: duplicate claims. Appropriate correction is required.

5. Claims 12-17 are objected to because of the following informalities: duplicate claims. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 6 recites the limitation "the working state" in line 7. There is insufficient antecedent basis for this limitation in the claim.

7. Claim 6 recites the limitation "the watchdog timer" in line 13. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

8. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

9. Claims 6-17 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Yang et al (US Pub. 2011/0220648; herein after Yang).

10. As per claim 6, Yang discloses a power-saving method for induction trash can circuit **[Fig. 1]**, comprising the steps of:

controlling the active infrared sensor to emit an infrared pulse signal to the induction area by a microcontroller in a standby state **[Fig. 22; para 0084, 0093-0094; a light emitter to emit an encrypted signal of light, such as infrared light; 0102-0106, 0115-0120; a microcontroller controlling the active infrared sensor to emit an infrared pulse signal to the induction area during a nap mode (i.e., standby state)]**;

setting the microcontroller into a sleep state if no reflection output signal is received from the active infrared sensor **[Fig. 22; para 0103, 0115-0120; as clearly shown in figure 22 if no detection, the system (i.e., main processor or microcontroller) remains in nap mode (i.e., sleep state)]**; or

remaining the microcontroller in the working state if a reflection output signal is received from the active infrared sensor and controlling the driving circuit to drive the motor to rotate forward to open the lid of the induction trash can, delaying for a few seconds after the motor has driven the lid to open, controlling the driving circuit to drive the motor to rotate backward to close the lid, and setting the microcontroller into the sleep state after the lid is closed **[Fig. 22; para 0102-0106, 0115-0120, 0133; clearly upon detection, the system either stays in working**

state or wakes up from the sleep mode and operating the trash can lid (open and close) and going back to the sleep state after the lid is closed]; and

waking up the microcontroller by the watchdog timer disposed therein after a preset time, so as to have the microcontroller reenter the working state and repeat the above steps under the standby state **[Fig. 22; para 0102-0106, 0115-0120, 0133; Time to Nap acts as a watchdog timer]**.

11. As per claim 7, Yang discloses further comprising the steps of: cutting off the power supply of the active infrared sensor when the microcontroller enters the sleep state **[Fig. 22; para 0102-0106, 0115-0120, 0133; continue to allow the system to sleep, in other not emit any light signals from emitter until the timer has elapsed]**; and restoring the power supply of the active infrared sensor, delaying for a preset threshold time for the active infrared sensor to enter a stable working state, controlling the active infrared sensor to emit an infrared pulse signal to the induction area when the microcontroller is in a standby state **[Fig. 22; para 0102-0106, 0115-0120, 0133]**.

12. As per claims 8-9, Yang discloses wherein the preset time is between 100ms and 500ms **[Fig. 22; para 0102-0106, 0115-0120, 0133; Time to Nap can be any designated time per design choice]**.

13. As per claims 10-11, Yang discloses wherein the preset threshold time is between 2ms and 50ms **[Fig. 22; para 0102-0106, 0115-0120, 0133; a design choice]**.

14. As per claims 12-17, Yang discloses wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can **[Fig. 1-2, 12-14; a design choice]**.

Note: Examiner kindly like to point out that a touchless trash can is well known in the art and have been selling for long time in the market [cited "Touchless Trashcan" non-patent literature "As Seen On TV" by iTouchless] and power saving by intermittently enabling/disabling a signal receiver module when a microprocessor is in a sleep mode is also well known [US Pub. 2018/0159634; one of many prior arts].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SURESH K SURYAWANSHI whose telephone number is (571)272-3668. The examiner can normally be reached on M-F 8:30-5:00 PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth M Lo can be reached on 5712729774. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SURESH SURYAWANSHI/
Primary Examiner, Art Unit 2116

Notice of References Cited	Application/Control No. 16/315,652	Applicant(s)/Patent Under Reexamination WANG et al.	
	Examiner SURESH K SURYAWANSHI	Art Unit 2116	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-D639520-S	06-2011	Lin; Cuiwen		D34/7
*	B	US-20180159634-A1	06-2018	LO; LI SHENG	H04B1/16	1/1
*	C	US-20150249767-A1	09-2015	Utsumi; Yuichi	H04N1/00551	358/1.14
*	D	US-20160359358-A1	12-2016	JEONG; Yeon Moon	H03K17/79	1/1
*	E	US-20130045005-A1	02-2013	Nakura; Kenichi	H04B10/272	398/25
*	F	US-9510401-B1	11-2016	Kost; Michael A.	H05B45/14	1/1
*	G	US-6974948-B1	12-2005	Brent; Mark R.	G01V8/20	250/221
*	H	US-20110220648-A1	09-2011	Yang; Frank	B65F1/1638	220/211
*	I	US-8686676-B2	04-2014	Yang; Frank	B65F1/1638	318/466
*	J	US-4207466-A	06-1980	Drage; David J.	H03K17/941	250/338.1
*	K	US-20090194532-A1	08-2009	Yang; Frank	B65F1/1638	220/211
*	L	US-20070182551-A1	08-2007	Yang; Frank	B65F1/08	340/545.3
*	M	US-20180343139-A1	11-2018	Saxena; Ashutosh	G05B19/04	1/1

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N	GB-2466492-A	06-2010	GB	GUNN JEFFERY MATTHEW TITCHENER	G06F1/3203
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	iTouchless, "Touchless Trashcan", 2004, iTouchless, pages 6 (Year: 2004)
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Petitioner Ex 1002, p. 128
EKO v. Nine Stars, IPR2025-01369

Notice of References Cited	Application/Control No. 16/315,652	Applicant(s)/Patent Under Reexamination WANG et al.	
	Examiner SURESH K SURYAWANSHI	Art Unit 2116	Page 2 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20060214620-A1	09-2006	Chan; Chi Tau	B65F1/1607	318/480
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	C					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
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	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Petitioner Ex 1002, p. 129
EKO v. Nine Stars, IPR2025-01369

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/315,652	WANG et al.
	Examiner	Art Unit
	SURESH K SURYAWANSHI	2116

CPC - Searched*		
Symbol	Date	Examiner
G05B 19/0426	5/13/20, 5/14/20	SS

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
700	83	5/13/20, 5/14/20	SS

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST; USPAT; US-PGPUB; EPO; JPO; IBM_TDB; NPL	5/13/20, 5/14/20	SS

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
220 / B65F	211 / 1/1638	5/13/20, 5/14/20	SS
340 / G08B	545.3 / 13/18	5/13/20, 5/14/20	SS
250 / H04N	338.1 / 5/33	5/13/20, 5/14/20	SS

Petitioner Ex 1002, p. 130
EKO v. Nine Stars, IPR2025-01369

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	induction adj trash adj can	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:01
S2	0	induction adj trash adj can	EPO; JPO; IBM_TDB	OR	OFF	2020/05/13 16:02
S3	155	trash adj can and (power$1sav$3 power adj sav$3)	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:05
S4	107	trash adj can and (power$1sav$3 power adj sav$3) and infrared	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:06
S5	98	trash adj can and (power$1sav$3 power adj sav$3) and infrared and (sleep standby)	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:07
S6	1	trash adj can and (power$1sav$3 power adj sav$3) and infrared and (sleep standby) and watchdog	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:08
S7	97	trash adj can and (power$1sav$3 power adj sav$3) and infrared and (sleep standby) and timer	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:08
S8	3	(waste trash) adj can with infrared and (power$1sav$3 power adj sav$3) and (sleep standby) and timer	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:10
S9	0	(waste trash) adj can with infrared and (power$1sav$3 power adj sav$3) and (sleep standby) and timer	EPO; JPO; IBM_TDB	OR	OFF	2020/05/13 16:12
S10	0	trash adj can and (power$1sav$3 power adj sav$3) and infrared and (sleep standby) and timer	EPO; JPO; IBM_TDB	OR	OFF	2020/05/13 16:14
S11	417	standby adj (power$1sav$3 power adj sav$3)	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:15

S12	177	standby adj (power$1sav$3 power adj sav$3) with (circuit device unit)	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:21
S13	6	standby adj (power$1sav$3 power adj sav$3) with (circuit device unit) and watchdog	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:22
S14	0	standby adj (power$1sav$3 power adj sav$3) with (circuit device unit) and watchdog	EPO; JPO; IBM_TDB	OR	OFF	2020/05/13 16:30
S15	1	standby adj (power$1sav$3 power adj sav$3) same watchdog	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:34
S16	8	standby adj (power$1sav$3 power adj sav$3) and watchdog	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:35
S17	0	standby adj (power$1sav$3 power adj sav$3) and watchdog	EPO; JPO; IBM_TDB	OR	OFF	2020/05/13 16:37
S18	33	standby adj (power$1sav$3 power adj sav$3) and intermittently	US-PGPUB; USPAT	OR	OFF	2020/05/13 16:37
S19	0	standby adj (power$1sav$3 power adj sav$3) and intermittently	EPO; JPO; IBM_TDB	OR	OFF	2020/05/13 16:53
S20	178	("20030090252" | "20030111969" | "20030160576" | "20030174520" | "20030214821" | "20030223255" | "20040037094" | "20040046683" | "20040196672" | "20050057237" | "20050207190" | "20050231183" | "20050270813" | "20050275354" | "20060013026" | "20060022648" | "20060214603" | "20070103949" | "20080018261" | "20080043504" | "20080062584" | "20080062586" | "20080117656" | "20080130336" | "20080175029" | "20080224636" | "20080259655" | "20080272744" | "20080272747" | "20080272755" | "20080273356" | "20080278132" | "20080310194" | "20090059632" | "20090067204" | "20090108677" | "20090184665" | "20090243582" | "20090295228" | "20090295300" |	US-PGPUB; USPAT; USOCR	OR	OFF	2020/05/13 17:45

		"20100128501" | "20100194198" | "20100225293" | "20100238689" | "20100244793" | "20110110132" | "20110199793" | "20110276938" | "20110291583" | "20110309760" | "20120056551" | "20120146540" | "20120176819" | "20120187997" | "20120248998" | "20120320640" | "20130181635" | "20140218978" | "3790878" | "4677366" | "4683529" | "4737658" | "4739462" | "4937728" | "4940929" | "4977366" | "5001620" | "5003454" | "5055746" | "5109185" | "5173643" | "5264780" | "5278490" | "5383109" | "5424932" | "5430635" | "5479333" | "5481178" | "5565761" | "5638265" | "5691890" | "5747977" | "5757635" | "5764039" | "5783909" | "5798635" | "5808453" | "5874725" | "5960207" | "5994885" | "6043633" | "6084450" | "6091233" | "6160724" | "6229292" | "6259614" | "6300723" | "6304066" | "6304473" | "6343026" | "6356040" | "6445600" | "6469484" | "6510995" | "6531854").PN. OR ("6580258" | "6583550" | "6628106" | "6657417" | "6696803" | "6724174" | "6768655" | "6781351" | "6839247" | "6882552" | "6894471" | "6933706" | "6940733" | "6944034" | "6956750" | "6975523" | "6980446" | "7072191" | "7099163" | "7157889" | "7161816" | "7221130" | "7233135" | "7266001" | "7292013" | "7295452" | "7411379" | "7554473" | "7606532" | "7647125" | "7667986" | "7684223" | "7719246" | "7719248" | "7746043" | "7755525" | "7804480" | "7821237" | "7834553" | "7863828" | "7872883" | "7888922" | "7894216" | "7969125" | "8008898" | "8008902" | "8018171" | "8040703" | "8076920" | "8120341" | "8125805" | "8169806" | "8179110" | "8188677" | "8193717" | "8222772" | "8232736" | "8242764" | "8248145" | "8344707" | "8369109" | "8441210" | "8487591" | "8536799" | "8610364" | "8654483" | "8803439" | "8816593" |			

		"8866452" | "8912781").PN. OR ("9510401").URPN.				
S21	8	S20 and infrared	US-PGPUB; USPAT	OR	OFF	2020/05/13 17:48
S22	0	S20 and (trash waste) adj can	US-PGPUB; USPAT	OR	OFF	2020/05/13 17:50
S23	19	(power$1sav$3 power adj sav$3) with standby with (circuit device unit) same infrared	US-PGPUB; USPAT	OR	OFF	2020/05/13 18:00
S24	3	(power$1sav$3 power adj sav$3) with standby with (circuit device unit) same infrared	EPO; JPO; IBM_TDB	OR	OFF	2020/05/13 18:08
S25	1	touchless near2 (trashcan trash$1can)	US-PGPUB; USPAT	OR	OFF	2020/05/14 10:05
S26	0	touchless near2 (trashcan trash$1can)	EPO; JPO; IBM_TDB	OR	OFF	2020/05/14 10:21
S27	97	("3564231" | "4042821" | "4044250" | "4052120" | "4092642" | "4207466" | "4234096" | "4266124" | "4335316" | "4434363" | "4560912" | "4590410" | "4621452" | "4625115" | "4659922" | "4729490" | "4820030" | "4851746" | "4853531" | "4864121" | "4875761" | "4880980" | "4888532" | "4893005" | "4894952" | "4980547" | "4981275" | "4996467" | "5003169" | "5008530" | "5015840" | "5080457" | "5198661" | "5210406" | "5276391" | "5295605" | "5302942" | "5319496" | "5321490" | "5329212" | "5393973" | "5410149" | "5414256" | "5424533" | "5461227" | "5492238" | "5539198" | "5575550" | "5610391" | "5654831" | "5770935" | "5805288" | "5932982" | "5984262" | "6150939" | "6166371" | "6504143" | "6596983").PN. OR ("6974948").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/05/14 10:22

S28	11	S27 and power adj (sav$3 conserv$5 reduc$4 consum$5)	US-PGPUB; USPAT	OR	OFF	2020/05/14 10:23
S29	16	(trashcan trash adj can) with power adj operated adj lid	US-PGPUB; USPAT	OR	OFF	2020/05/14 10:34
S30	10	(trashcan trash adj can) with power adj operated adj lid and power adj (sav$3 reduc$4 conserv$5 consum$5)	US-PGPUB; USPAT	OR	OFF	2020/05/14 10:37
S31	0	(trashcan trash adj can) with power adj operated adj lid and power adj (sav$3 reduc$4 conserv$5 consum$5)	EPO; JPO; IBM_TDB	OR	OFF	2020/05/14 10:38
S32	0	(trashcan trash adj can) with power adj operated adj lid	EPO; JPO; IBM_TDB	OR	OFF	2020/05/14 10:38
S33	13260	(G05B19/0423 or G05B19/042 or G06F1/3234 or B65F1/00 or B65F2210/168 or B65F1/16 or G05B19/0426).cpc.	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:18
S34	15	S33 and (trashcan trash$1can) and infrared	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:19
S35	14	S33 and (trashcan trash$1can) and power adj (sav$3 reduc$4 conserv$5 consum$5)	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:21
S36	0	S33 and (trashcan trash$1can) and watchdog	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:26
S37	66	S33 and infrared and watchdog	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:26
S38	13	S33 and infrared and watchdog and wak$3	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:26
S39	35	S33 and infrared and watchdog and (sleep low$1power nap)	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:28

S40	6	infrared with garbage adj can	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:52
S41	0	infrared with garbage adj can	EPO; JPO; IBM_TDB	OR	OFF	2020/05/14 13:55
S42	89	infrared and garbage adj can and power adj (sav$3 reduc$4 conserv$5 consum$5)	US-PGPUB; USPAT	OR	OFF	2020/05/14 13:55
S43	68	infrared and garbage adj can and power adj (sav$3 reduc$4 conserv$5 consum$5) and (standby sleep nap idle)	US-PGPUB; USPAT	OR	OFF	2020/05/14 14:04
S44	0	infrared and garbage adj can and power adj (sav$3 reduc$4 conserv$5 consum$5) and (standby sleep nap idle)	EPO; JPO; IBM_TDB	OR	OFF	2020/05/14 14:07
S45	0	dustbin with (low$power power adj (sav$3 reduc$4 conserv$5 consum$5))	US-PGPUB; USPAT	OR	OFF	2020/05/14 14:40
S46	68	dustbin and (low$power power adj (sav$3 reduc$4 conserv$5 consum$5))	US-PGPUB; USPAT	OR	OFF	2020/05/14 14:41
S47	58	dustbin and (low$power power adj (sav$3 reduc$4 conserv$5 consum$5)) and (standby sleep nap idle)	US-PGPUB; USPAT	OR	OFF	2020/05/14 14:41
S48	0	dustbin and (low$power power adj (sav$3 reduc$4 conserv$5 consum$5)) and (standby sleep nap idle)	EPO; JPO; IBM_TDB	OR	OFF	2020/05/14 14:42

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(51) INT CL:
G06F 1/32 (2006.01) ***G06F 21/00*** (2006.01)

(56) Documents Cited:
EP 1521159 A1
US 20050071698 A1
US 20040181702 A1
US 20030051181 A1
US 20020147931 A1
US 20060195699 A1
US 20050049760 A1
US 20030177402 A1
US 20030034877 A1

(58) Field of Search:
INT CL **G06F**
Other: **Online: EPODOC, WPI**

(54) Title of the Invention: **Energy saving device**
Abstract Title: **A power saving device for instructing a computer to enter a standby state when a user leaves the vicinity of the device**

(57) A power saving device 350 for a computer comprising a connection, e.g. USB cable, for connecting the device to a computer, a sensor 354 configured to detect the presence of a computer user in a predetermined vicinity of the device 350, and a controller configured to indicate to the computer when the user is no longer within the predetermined vicinity and thereby cause the computer to enter a power saving standby state. The sensor 354 may be a passive infrared (PIR) sensor or a radio frequency identification (RFID) sensor (650 fig.7), which detects the presence or absence of a transponder (660 fig.7) carried by a user. Preferably, when a user returns to the vicinity of the device 350, the device 350 re-awakens the computer from the power saving state and may test whether the user is authorized to use the computer, e.g. by entry of a password or biometric identification.

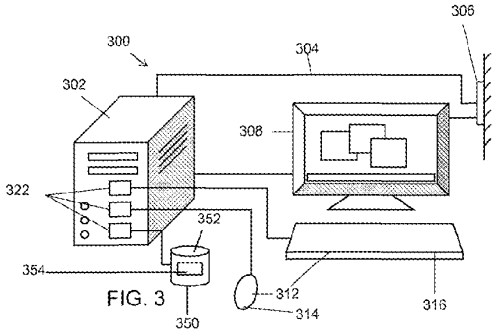


FIG. 3

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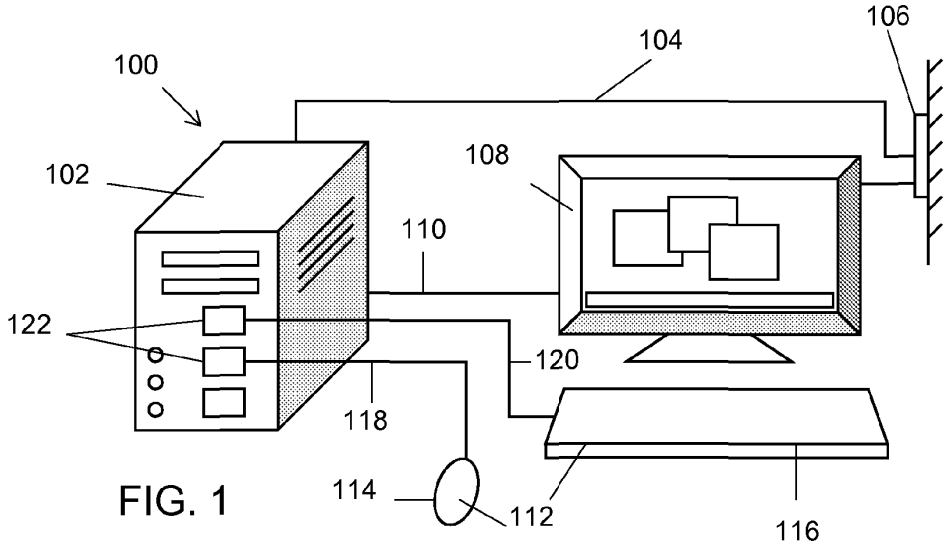


FIG. 1

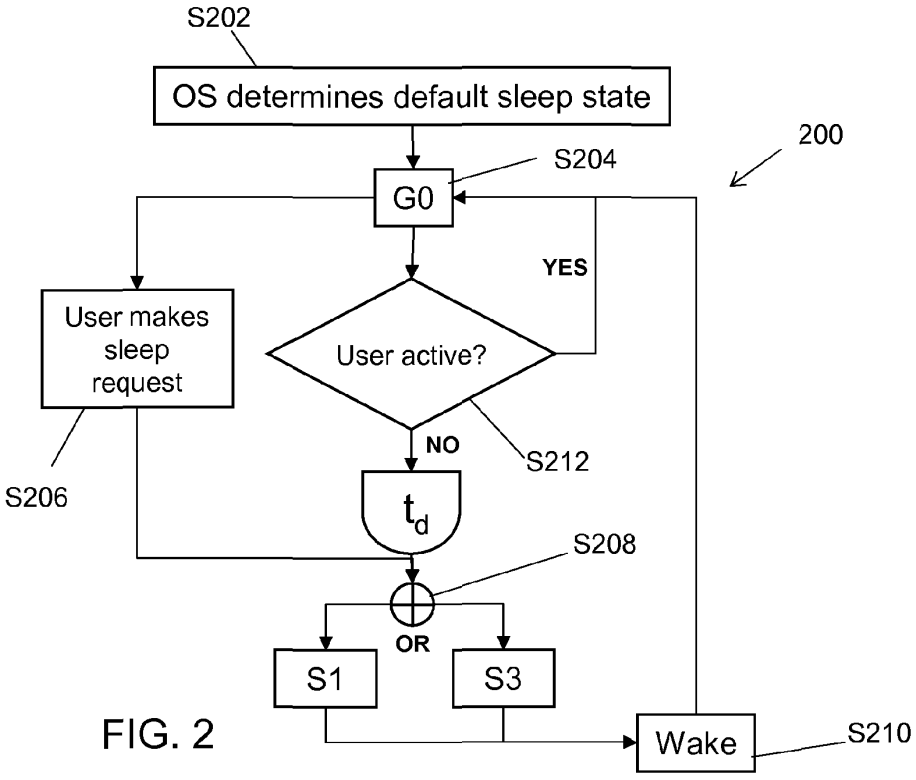


FIG. 2

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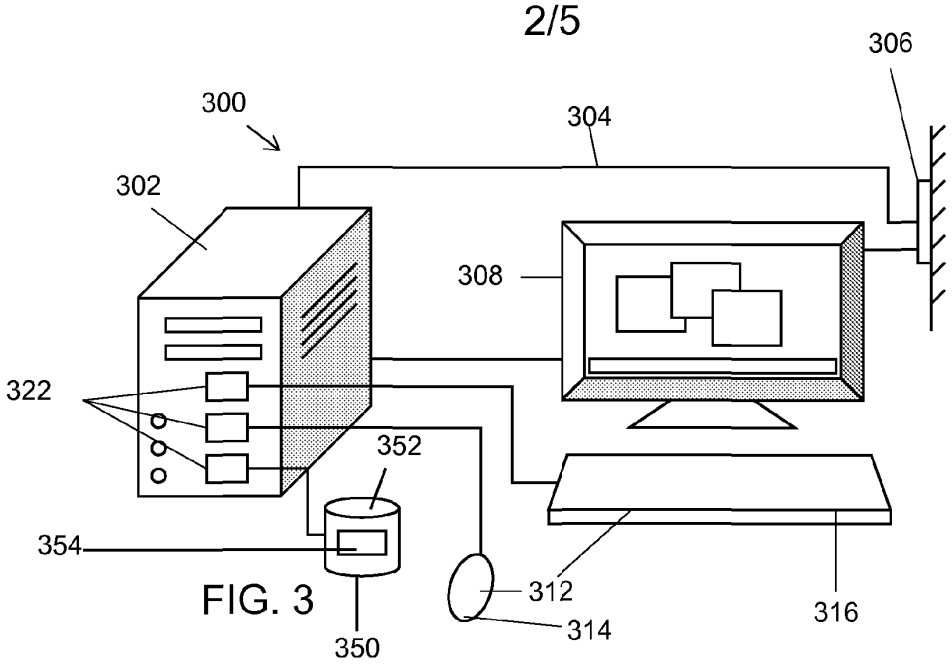


FIG. 3

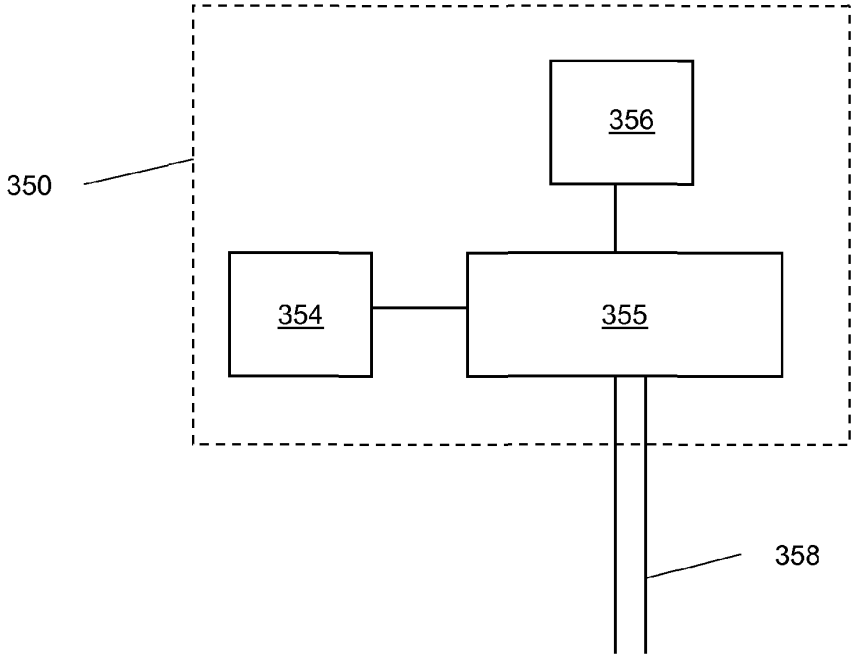


FIG. 4

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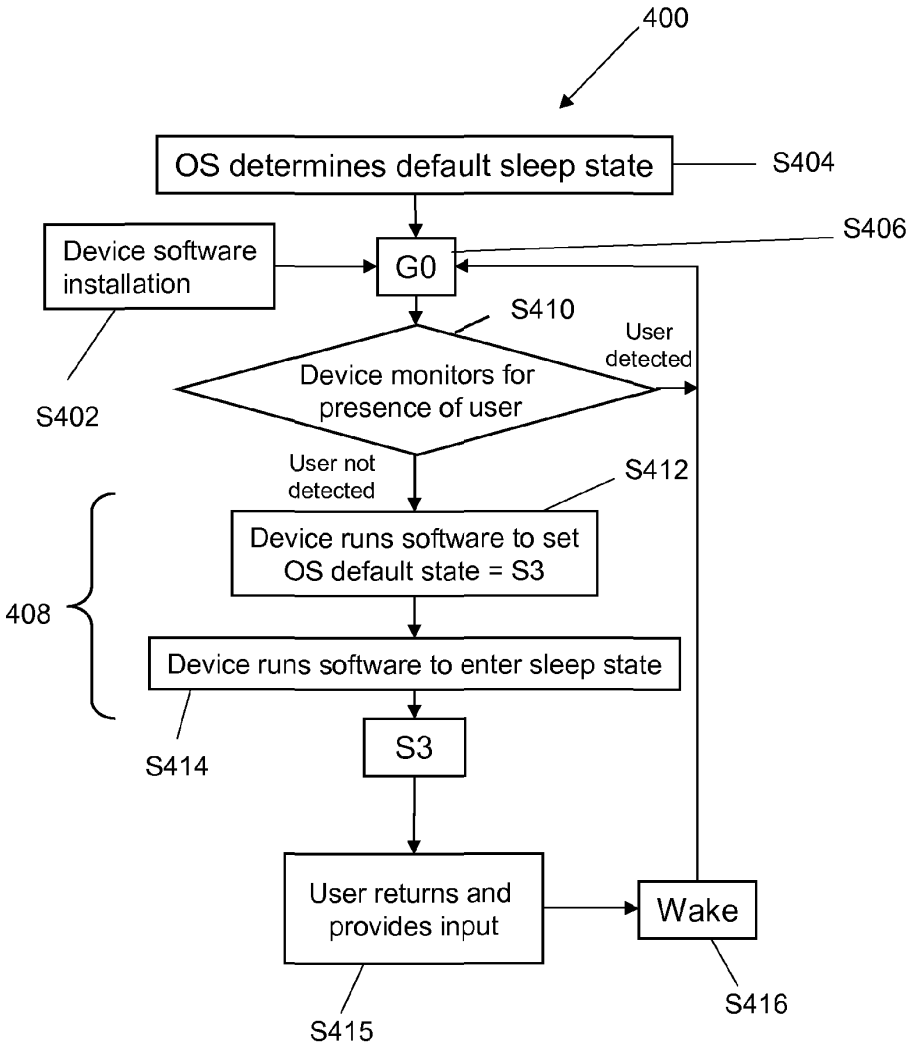


FIG. 5

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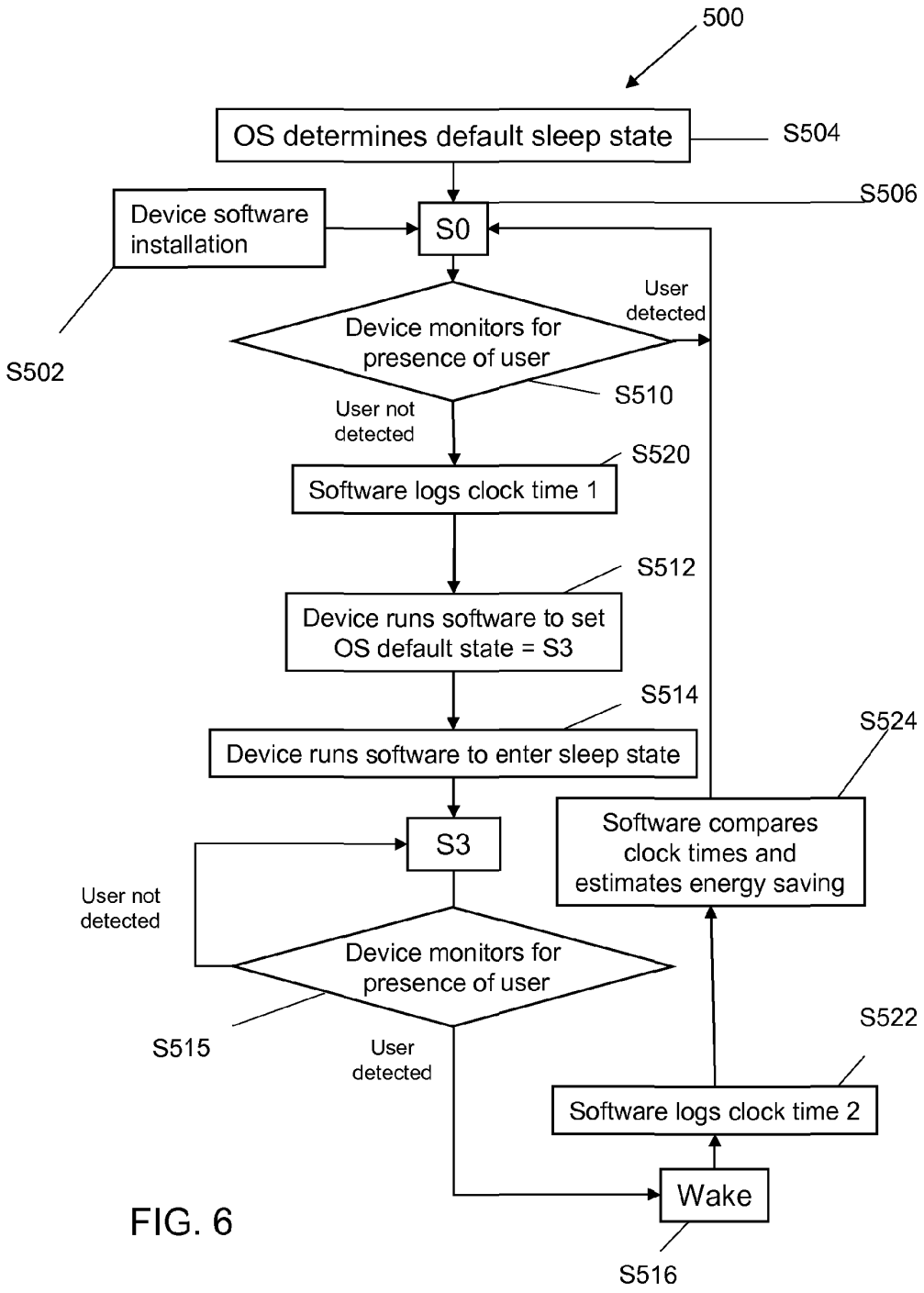


FIG. 6

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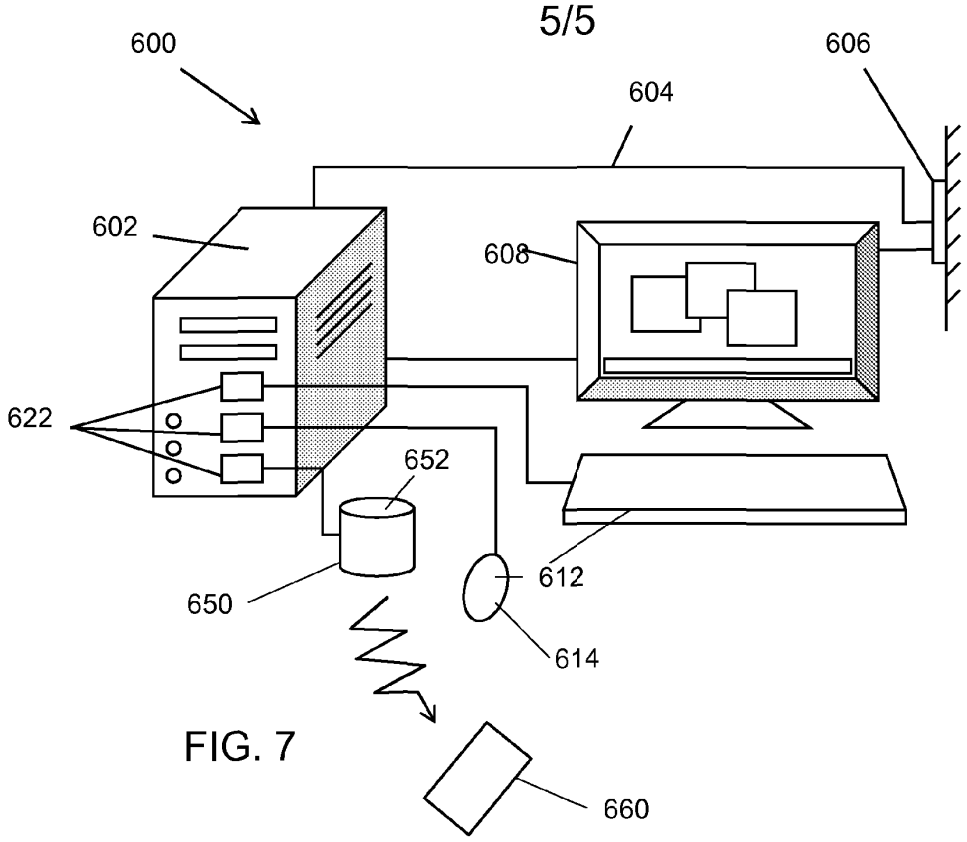


FIG. 7

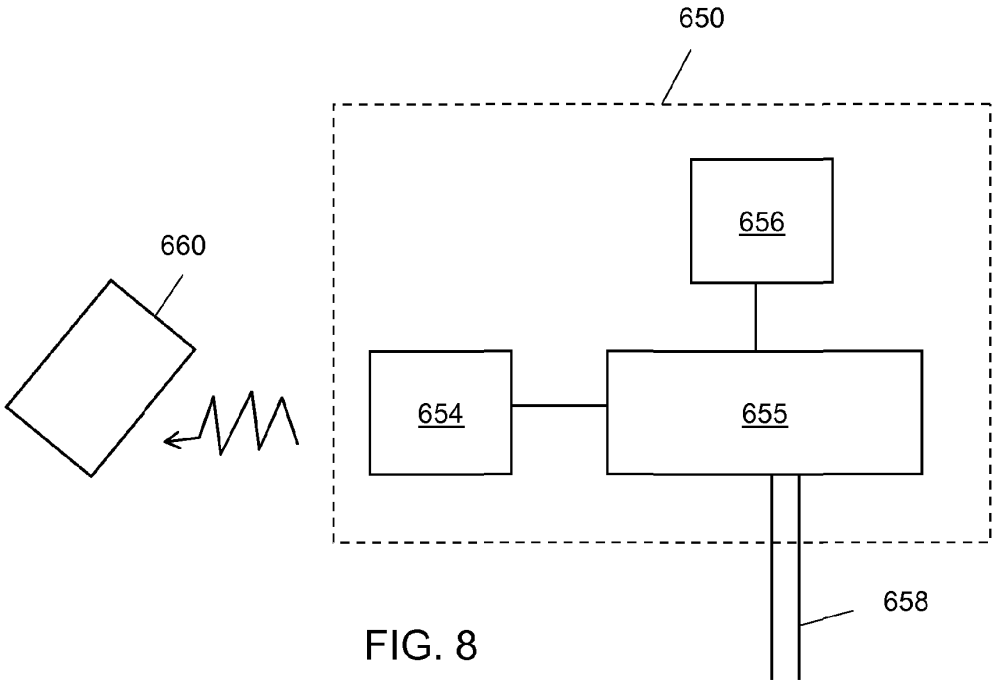


FIG. 8

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Energy saving device

The present invention is concerned with reducing energy consumption of programmable electronic devices, and more specifically with reducing energy consumption in computers.

Typically, computers such as PCs consume in the order of 150 - 200W (Watts) when in use, and in the order of 5W when switched off, but still plugged in. Modern computer systems have operating systems (OS) which are capable of putting the computer into a state in which the power consumption is reduced. For example, they may deactivate certain peripherals such as the display, or hard drive. These peripherals are generally not required when a user is not operating the computer.

A known power management standard is the ACPI (Advanced Configuration and Power Interface) standard. Most motherboards of IBM compatible PCs produced in recent years adhere to this standard. The ACPI standard has a number of global states into which the OS can place the computer. These are:

G0 - in which the computer is fully operable. The power state of devices may be changed dynamically.

G1 - this state is split into four sub-states, or sleep states; S1 to S4. The computer appears off to the user, but this is because peripherals such as the display are powered down. The system's context is preserved (i.e. active memory is stored).

G2 - (a.k.a. S5; see below) "soft off" in which the computer system is mostly deactivated with the exception of minimal power to provide awakening upon certain input. The system's context is not stored in this state.

G3 - "mechanical off" in which the computer is fully shut down, and ready to be unplugged. In the G3 state the power consumption is typically lowest, as only the system real-time clock is kept powered. The computer has to be mechanically switched on to return to any other state.

The G1 sleep states are commonly used during regular use, as they all provide a relatively short time (known as the wake latency time) to return to the G0 state.

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Furthermore the system's context is maintained and as such the user can continue working. The G1 sleep states are defined as follows:

S1 - Devices which do not indicate otherwise are deactivated, the CPU and main memory are powered. This state has the highest power consumption of the G1 sleep states (in the order of 150W), although the wake latency is time is shortest of the G1 sleep states.

S2 - As S1, however with the CPU powered down, and the system cache emptied. The power consumption is lower than S1, although the wake latency time is longer.

S3 - As S2, except all system context (except for the main system memory) is lost. The power consumption is lower than S2 and S1 (S3 power consumption is in the order of 5W), although the wake latency time is longer. However, to an end user the difference in the wake latency time between S1 and S3 states is negligible, and both appear "instantaneous" (i.e. wake latency times are within a few seconds). In addition, programs, windows etc are restored to their original position on-screen due to the retention of the main system memory context.

S4 - All devices are powered off, although the context is maintained by storing memory on, for example, the hard disk. This state is often called "hibernate". The power consumption is lower than S3, although the wake latency time is significantly longer, as the hard disk needs to be read from.

S5 - As G3; the system's context is simply not stored (as opposed to S4).

Computer systems can be supplied with an OS that allows an ACPI state to be entered after a certain period of inactivity. This can also be user specified. However, the user is simply given a choice of altering settings for a "sleep" state (i.e. one of S1 to S3; S4 is known as "hibernation"). Control over which G1 sleep state into which the computer passes is usually hidden from the user, within the OS.

In an OS such as Windows XP, 2000, 2003 and ME (all trademarks of the Microsoft Corporation), the default G1 sleep state into which the system passes is determined upon OS installation. This is generally determined by the hardware found by the OS. In modern systems, it is conceivable that the OS will determine that S3 is the most

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appropriate default G1 sleep state (having a lower power consumption that S1 and S2 and still having a relatively low wake latency time).

However, when USB peripheral devices are added to the system (e.g. mice), the computer BIOS may report to the OS that these devices are not capable of waking the system from an S3 state and as such the OS changes the default sleep state to S1 (with a higher power consumption than S3, but with higher system integrity such that a return to the G0 state is easier). Some versions of Windows XP automatically prevent entry into S3 state when USB keyboard / mouse devices are connected as the Windows registry is configured to instruct the BIOS to always return an S1 wake capability to the OS for any USB devices.

As such, the power consumption during the sleep state is significantly higher (potentially in the order of 3000 percent higher) with USB peripherals connected. This use of the S1 state instead of S3 is merely a failsafe control to prevent system crashes, and in fact many USB devices will work adequately using the S3 state. Needless use of the S1 state in place of the S3 state wastes power and incurs expense for the user and / or owner of the computer in power bills. This is especially true as most users are unaware of which state the OS has selected.

Additionally, many computer systems do not have a straightforward method of activating the G1 sleep state on demand. Activation of the sleep state is often timer controlled, which may be too long, resulting in the computer remaining in the power-hungry G0 state whilst idle, or too short, in which the sleep state may be entered when, for example, the user is reading from the display, or studying a display image. Some keyboards comprise a sleep button to engage the G1 sleep state, however if this function is required the entire keyboard must be replaced at great expense.

Needless to say, the above methods enter the default sleep mode determined by the OS, which is commonly not the most efficient state as described.

To overcome this problem we proposed in our earlier application EP07253057.9 a dedicated USB power saving device incorporating a button which, in conjunction with

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software installed on a corresponding computer, enables the computer to enter the most efficient power saving mode available with an acceptable wake latency time (typically the S3 sleep state).

However, we have recognised that one potential shortcoming with this device in some circumstances is the need for the user to remember to press the button in order to enter the energy saving state. This issue may be particularly relevant in an office environment where such a power saving device has been deployed office-wide by the IT department and individual users are non-compliant with such a system. Thus, in order to realise the environmental and financial benefits of using such a device, it is desirable that it may be operable without any direct user intervention.

It is an object of this invention to alleviate one or more of the above problems.

A technical problem solved by claim 1 is to provide a way of causing a computer to enter a power saving state without user intervention.

According to a first aspect of the invention there is provided a power saving device for a computer comprising a connection for connecting the device to a computer, a sensor configured to detect the presence of a computer user in a predetermined vicinity of the device and a controller configured to indicate to the computer when the user is no longer within the predetermined vicinity via the connection and thereby cause the computer to enter a power saving state.

Preferably the computer power saving device is a dedicated computer power saving device. By "dedicated" we mean that the primary or sole purpose of the device is the function stated.

Advantageously, a dedicated user input is provided which can be connected to a computer for the sole purpose of energy saving. As such, the device can be made easily operable (negating the need to manually change complex system settings), and furthermore does not require the replacement of any other hardware (e.g. replacement of a normal keyboard with a keyboard with a sleep function) to operate.

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Furthermore, modification of the default standby state ensures that the computer will enter the desired state (normally a state with lower power consumption) regardless of the peripherals attached.

According to a second aspect of the invention there is provided a computer power saving system comprising a computer, and a computer power saving device as described above.

According to a third aspect of the invention there is provided a computer power saving kit comprising a computer power saving device as described above and computer readable media configured to install the program onto the computer.

According to a fourth aspect of the invention there is provided a method of installing a computer power saving system comprising the steps of:

providing a computer power saving device as described above;

providing the program;

providing the computer;

connecting the computer power saving device to the computer; and

installing the program onto the computer.

According to a fifth aspect of the invention there is provided a method of installing a computer power saving system comprising the steps of:

providing a computer power saving kit as described above;

providing the computer;

connecting the computer power saving device to the computer; and

installing the program onto the computer from the computer readable media.

According to a sixth aspect of the invention there is provided a method of saving computer system power comprising the steps of:

providing a computer;

providing a program on the computer configured to

set a default standby state of the computer to a desired standby state,

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issue a command to the computer to enter the default standby state;

providing a power saving device configured to instruct the computer to run the program;

a user of the computer leaving a predetermined vicinity of the device thereby causing the device to instruct the program to run.

According to a seventh aspect of the present invention, there is provided a dedicated computer power saving device for a computer, the device comprising:

a connection for connecting the device to the computer, and

a dedicated user input configured to provide an input command to the computer upon operation, the input command configured to instruct the running of a program accessible by the computer, which program:

issues a command to cause the computer to enter a power saving state;

wherein the device further comprises a biometric identification device to check the identity of the user when attempting to re-awaken the computer from the power saving state and only permitting the computer to re-awaken if the user is authorised to access the computer.

A computer power saving system will now be described in detail with reference to the accompanying figures in which:

Figure 1 is a schematic representation of a known computer system;

Figure 2 is a schematic representation of a known standby process;

Figure 3 is a schematic representation of a computer power saving system incorporating a power saving device in accordance with a first embodiment of the present invention;

Figure 4 is a schematic representation of the power saving device shown in Figure 3.

Figure 5 is a schematic representation of a standby process in accordance with a first embodiment of the present invention;

Figure 6 is a schematic representation of a standby process in accordance with a second embodiment of the present invention;

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Figure 7 is a schematic representation of a computer power saving system incorporating a power saving device in accordance with a third embodiment of the present invention; and

Figure 8 is a schematic representation of the power saving device shown in Figure 7.

A known computer system 100 is shown in figure 1. The system comprises a computer base unit 102 containing the system memory / processors / hard drive and other known components. The base unit received power from power line 104 plugged into socket 106. An operating system (OS) such as Windows XP^{RTM} or Windows Vista^{RTM} is installed on the computer.

The computer system 100 further comprises a display 108 such as an LCD / CRT or the like. The display receives data from the base unit 102 via display connection 110.

The computer system 100 further comprises peripheral devices 112, specifically mouse 114 and keyboard 116. The mouse 114 and keyboard 116 are connected to the base unit 102 via connections 118 and 120 respectively. In this instance, peripheral devices 112 are connected via USB (universal serial bus) connectors 122. Although this is the case, it should be noted that connections 118, 120 may not be wired, and as such may be infra-red / Bluetooth® or any known connection that functions with a USB connector.

Figure 2 shows a known sequence 200 of operation to put the computer system 100 into a G1 sleep state. Firstly, the OS determines the default G1 sleep state that the system will adopt at S202. This is in response to the hardware capabilities of the system and occurs upon installation of the OS, connection of a USB device or upon a user input changing the settings of the OS such that the USB device can "wake" the system 100.

During normal use / operation the system is in the G0 state 204 (as described above). If the user makes a sleep request using either a keyboard based sleep button, or via interaction with the OS at step S206 the system enters the default G1 sleep state at step S208 depending on the sleep state chosen at S202. In this example the available

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G1 sleep states are S1 and S3. However, because of the issues outlined above, the default sleep state is typically set as S1. A wake command at step S210 will restore the system to the G0 state after the wake latency time.

Alternatively, the computer will monitor for user activity (e.g. mouse motion, keyboard input) at step 212. If no user input is detected, after time td (user specified in OS settings) the system will enter the default G1 sleep state as above.

A computer power saving system 300 in accordance with the present invention is shown in figure 3. Common components are numbered 200 greater than system 100.

System 300 additionally comprises a power saving device 350 illustrated schematically in Figure 4. The device 350 comprises a housing 352 incorporating a passive infrared (PIR) sensor 354 of the type well known from home security devices and the like. The PIR sensor 354 is connected to a controller 355, preferably a microprocessor or a control circuit configured to interpret a signal from the PIR sensor and provide an output via a USB cable 358 in accordance with pre-programmed settings. In this embodiment, the device also comprises a visual indicator, e.g. an LED 356 also connected to the controller to indicate when the device detects the presence of someone in range of the sensor 354.

The power saving device 350 is connected to base unit 302 via the cable 358 and one of the USB connectors 322. The power saving device is powered via the USB connection 358 from the computer system 100. The USB connection is also capable of transmitting data to the computer system 100 from the controller 355

The controller 355 of the power saving device 350 incorporates a keyboard emulator, and is recognised as a standard plug and play human interface device (HID) by Windows OS from Windows 98 onwards, and as such does not require specific driver software of its own. It is capable of issuing commands in the form of a series of keystrokes to be interpreted by the OS of the system 300, as will be described below.

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Figure 5 shows a schematic representation of a standby process 400 in connection with the system 300. To use system 300, the user installs software at step S402 onto the computer. The software can be downloadable, stored on a compact disc, DVD, or other appropriate media. Installation of the software may involve simply transferring an executable file onto the system hard disc (for example into the system32 folder on Windows operating systems).

Once installed, this software provides an executable file that can be initiated by a "run" command 408 in the system OS to change the default G1 state of the system to S3. This may be possible, for example in Windows XP by modifying the registry entry as follows:

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\usb
"USBBIOSx"=DWORD:00000000

As such, the OS will not always assume a S1 default state for all USB devices and the S3 state will be entered upon sleep (if possible). The command 408 referred will also initiate the G1 sleep state in the system.

As shown in figure 5, after the OS has determined the default G1 sleep state at step S404 (either during installation or addition of a USB device), the system is in G0 mode 406. When a user of the device 350 inserts it into a USB connection 322 on the base unit 302, the PIR sensor 354 is powered and becomes active. The sensor 354 must be directed towards the position where a user of the computer is normally seated in order that their presence can be reliably detected. To this end, the sensor 354 typically has a range of 1 - 5 metres, preferably 2 - 3 metres.

Whilst the user is positioned in front of their computer, the PIR sensor 354 will continuously or periodically (e.g. every five seconds) check for the presence of a user and send a corresponding signal to the controller 355. If a user is present the controller signals the lighting of the LED 356, to indicate that this is the case. If a user moves out of range of the PIR sensor 354, an appropriate signal will be sent from the sensor 354 to the controller 355 and the controller 355 signals the extinguishing of

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the LED 356. The LED 356 is not necessary for the functioning of the invention, but may be useful in informing a user that they are located correctly with respect to the device 350.

In order to prevent the controller signalling the running of the power saving program immediately upon a user moving out of range of the sensor 354, for example if they are only briefly away from their desk, a delay is preferably built into the functionality of the controller for a predetermined period (for example, 10 seconds, or if there is periodic sensing, there is no detection for two or three consecutive intervals) once a user is no longer detected within the range of the PIR sensor.

Once the delay has passed, the controller 355 emulates the keyboard input for the command 408, e.g. the input can simply be the command "run sleep" if the installed executable is named "sleep". Therefore the registry is modified at step S412 to the S3 default G1 sleep state and the sleep mode is entered at step S414. When a user provides an appropriate input at step S415, the system is then woken and returns to a GO state at step S416.

In this manner, the user can easily enter the S3 state without manually modifying the registry (which is potentially hazardous for the system). The G1 sleep state is also entered without having to provide a sleep button on the keyboard, interact with the OS or the user having to interact with the computer in any way. Furthermore, the user can rest assured that the most desirable and / or efficient state (in this case S3) is being entered and power will not be wasted employing the S1 state needlessly.

A further embodiment of the standby process 500 is illustrated in figure 6 and is substantially similar to the standby process 400 of figure 5. Common features are numbered 100 greater.

In addition to process 400, process 500 includes the additional steps of recording a computer clock time 1 at step S520 and clock time 2 at step S522, and comparing the clock times at step S524. These steps are carried out by the software, and by subtracting the clock time 1 from the clock time 2 the software can determine the

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amount of time spent in the S3 state. Additionally, this information can be displayed to the user.

Preferably, the software uses estimates of the computer system power consumption at the S1 state and S3 to approximate the energy saved by using the device. This information can then be displayed to the user (along with the amount of money saved if the cost of energy is input into the software), stored for future reference, or communicated to a central area or IT department to determine the total energy saving over a length of time and / or by a number of computer systems. The display of energy and money saved by use of the device is an important way of giving the user the incentive the to continue using the device, thereby ensuring that the behavioural change becomes ingrained. However, even if the user is not enthusiastic about using the device, by making it require little or no intervention to function, the benefits of its use will still continue to accrue.

Upon installation, the software may determine the hardware power consumption by asking the user for the specifications of various components of the system or simply determining the specifications from the system itself.

With reference to Figure 7, a further power saving system in accordance with the present invention is shown. Common components are numbered 300 greater than for the system 300 of Figure 3. Similar components to those of Figure 3 are not discussed in depth.

In this embodiment, the PIR sensor 354 of the power saving device has been replaced by a radio frequency identification (RFID) sensor 654 of a known type that is provided in a housing 652 and is linked to a controller 655. The device 650 is also, in this embodiment, provided with an LED 356 to indicate whether the transponder is detected, although this is not necessary for the functioning of the invention.

A user of the computer is provided with a RFID transponder 660 encapsulated within a card, key fob or the like that is carried about their person. The transponder is

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preferably passive (i.e. the response is powered from the energy of the interrogation signal). In other embodiments it may have its own power supply.

In this embodiment, the RFID sensor 654 periodically transmits (e.g. every 5 seconds) an interrogation signal to the transponder 660 which if within the range of the reader, transmits a response. If the response is interpreted as being valid by the controller 655, the controller does not transmit the command to the computer to execute the sleep program. If, however, the transponder 660 moves out of range of the RFID sensor 654, the controller will (optionally after a predetermined delay, e.g 2 or 3 interrogations not receiving a valid response) signal the execution of the sleep command as in the earlier embodiment and the computer will enter a power saving sleep state.

In one embodiment, a user may provide a keyboard input to bring the computer system 600 out of the sleep state. In an alternative embodiment, the RFID sensor 654 may continue to monitor for the transponder whilst the computer is in a sleep state, and when the transponder is again detected, will signal the re-awakening of the computer by issuing a keyboard input. In this embodiment, the detection device may be provided with an internal battery (not shown) to power the RFID sensor 654 and controller 655 whilst the computer is in a sleep state, since no power will be provided to the device via the USB cable. This battery may be recharged via the USB cable whilst the computer system 600 is awake.

In a particularly preferred embodiment, the RFID sensor 654 and transponder 660 may be "paired" such that the computer system 600 will only remain awake whilst a particular transponder 660 emitting a particular identification code is detected by the RFID reader 654. This may provide an additional level of security for the user of the computer system 600.

Many variations and modifications fall within the scope of the present invention. For example, the software may be stored on flash memory inside the user input device, and may offer to automatically install via an "autorun" program when the device is

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connected to the computer, thus obviating the need for a separate installation disc, or download.

The device software may not modify the default G1 sleep state, but instead enter whatever state is the default in the computer at that time. The software may enable the user to choose which sleep state they wish the device to enter when initially installing the software, or at some point thereafter

The executable file may additionally provide messages to the user upon entry to and / or exit from the standby state. For example, a simple message may be shown thanking the user for using the device. Additionally, an advertisement may appear, preferably including a hyperlink to a target website. The message can be configured to disappear after a few seconds to prevent disruption of use of the computer.

The device need not be connected to the system via USB, but by any means suitable for a keyboard emulator; e.g. wireless (e.g. Bluetooth®, or infra-red) connection. The computer may be a laptop or a desktop. The device may be battery powered, solar powered or mains electricity powered rather than drawing power from the USB port of the computer. This may be particularly applicable if the device is wirelessly connected to the computer. The first embodiment of the invention may also be configured to monitor for the return of a user whilst the computer system is in a power saving state, and to wake the system upon detecting their return

The device may also have a button provided thereon that may be actuated to cause the computer to enter a sleep state when a user is at their desk but not using the computer and / or to provide the necessary input to wake the system.

The device may instruct the computer to enter a power saving state by another mechanism, for example by interacting directly with the power control API of Microsoft Windows.

In another embodiment, the device is not dedicated, and is provided on a keyboard, mouse, display, webcam, USB hub or the like.

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For additional security, the device may incorporate a suitable biometric identification apparatus such as a fingerprint reader, or camera for facial recognition or iris scanning and the software is adapted such that only a user whose biometric data has previously been registered with the device software may awaken the computer and have access thereto. In accordance with another embodiment of the present invention, such an apparatus may be incorporated into devices not having proximity sensing, but just a button or other manual input means.

The program may also run directly from the device itself.

The program may log each use and / or report each use to a central server such that an IT department can monitor use of the device.

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Claims

1. A power saving device for a computer comprising:

a connection for connecting the device to a computer;

a sensor configured to detect the presence of a computer user in a predetermined vicinity of the device; and

a controller configured to indicate to the computer when the user is no longer within the predetermined vicinity via the connection and thereby cause the computer to enter a power saving state.

2. A power saving device for a computer further configured such that when a computer user returns to the predetermined vicinity of the device, the device is configured to re-awaken the computer from the power saving state.

3. A power saving device for a computer according to claim 1 or claim 2 wherein the device is configured such that the user is prompted to pass a security test before being able to use the computer upon their return.

4. A power saving device according to claim 3 wherein the security test comprises the entry of a password.

5. A power saving device according to any preceding claim wherein the device is configured to directly sense the presence of a person.

6. A power saving device according to claim 5 wherein the device comprises an infra-red detector to directly sense the presence of a person.

7. A power saving device according to any one of claims 1 to 4 wherein the device is configured to detect the presence of a matching component carried by the user.

8. A power saving device according to claim 7 wherein the device uses radio-frequency communications to detect the component carried by the user.

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9. A power saving device according to claim 8, wherein the device comprises an RFID reader and the user carries an RFID transponder.

10. A power saving device according to claim 8 wherein the device and the component are configured to communicate using the 'bluetooth' protocol.

11. A power saving device according to any preceding claim further comprising a biometric identification device to check the identity of the person returning to the predetermined vicinity and only permit the computer to re-awaken if the person is authorised to access the computer.

12. A power saving device according to any preceding claim wherein the device is dedicated solely to the function of reducing the power consumption of a computer when operated.

13. A power saving device for a computer according to any preceding claim in which the connection comprises a USB connection.

14. A computer power saving system comprising a computer and a power saving device according to any preceding claim.

15. A computer power saving kit comprising:
a computer power saving device according to any of claims 1 to 13 and;
computer readable media configured to install the program onto the computer

16. A method of installing a computer power saving system comprising the steps of:
providing a computer power saving device according to any of claims 1 to 13;
providing the program;
providing the computer;
connecting the power saving device to the computer; and
installing the program onto the computer.

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17. A method of installing a computer power saving system comprising the steps of:

providing a computer power saving kit according to claim 15;

providing the computer;

connecting the power saving device to the computer; and

installing the program onto the computer from the computer readable media.

18. A method of saving computer system power comprising the steps of:

providing a computer;

providing a program on the computer configured to

set a default standby state of the computer to a desired standby state,

issue a command to the computer to enter the default standby state;

providing a power saving device configured to instruct the computer to run the program;

a user of the computer leaving a predetermined vicinity of the device thereby causing the device to instruct the program to run.

19. A method of saving computer system power according to claim 18 in which the step of setting the default standby state comprises the step of modifying the OS registry.

20. A method of saving computer system power according to claim 18 or 19 in which the step of setting the default standby state comprises the step of setting the default standby state to the ACPI S3 state.

21. A dedicated computer power saving device for a computer, the device comprising:

a connection for connecting the device to the computer, and

a dedicated user input configured to provide an input command to the computer upon operation, the input command configured to instruct the running of a program accessible by the computer, which program:

issues a command to cause the computer to enter a power saving state;

wherein the device further comprises a biometric identification device to check the identity of the user when attempting to re-awaken the computer from the power

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saving state and only permitting the computer to re-awaken if the user is authorised to access the computer.

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Application No: GB0823415.5 **Examiner:** Dan Hickery

Claims searched: 1 to 20 **Date of search:** 19 June 2009

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-4, 7-10, 12-20	EP 1521159 A1 (TOPSEED TECHNOLOGY) whole document
X	1-6, 12, 14-20	US 2006/195699 A1 (LIAO) whole document
X	1, 2, 5, 6, 11, 12, 14-20	US 2005/071698 A1 (KANGAS) whole document, especially par.0048, 0053, 0070
X	1, 2, 7-9, 12, 14-20	US 2005/049760 A1 (NARAYANASWAMI) whole document, especially par.0026
X	1, 2, 5, 6, 12, 14-20	US 2004/181702 A1 (CHENG) whole document
X	1, 2, 5, 6, 12, 14-20	US 2003/177402 A1 (PIAZZA) whole document, especially par.0021
X	1, 2, 7-10, 12, 14-20	US 2003/051181 A1 (MAGEE) whole document, especially par.0019
X	1, 2, 5-10, 12, 14-20	US 2003/034877 A1 (MILLER) whole document, especially par.0011, 0022
X	1, 2, 5, 6, 12, 14-20	US 2002/147931 A1 (LIU) whole document

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[X] :

Worldwide search of patent documents classified in the following areas of the IPC

G06F

The following online and other databases have been used in the preparation of this search report

Online: EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
G06F	0001/32	01/01/2006
G06F	0021/00	01/01/2006

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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/315,652	Filing Date 01/06/2019	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	09/14/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 12	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/JESSICA T GAYNOR/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. 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 1.14. This collection is estimated to take 12 minutes 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. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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In The United States Patent and Trademark Office

Application Number: 16/315,652 Examiner: Suryawanshi, Suresh
Applicant(s): Xin WANG Group Art Unit: 2116
Filing Date: 01/06/2019 Att. Docket No.: USP10302A-NSG
Title: Induction Trash Can Circuit Standby Power-Saving Method

Date: 08/27/2020

AMENDMENT A

Honorable Commissioner for Patents,
P.O. Box 1450,
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed 05/18/2020, kindly amend the above application as follows.

SPECIFICATION AMENDMENTS

Kindly add the appended Abstract as a new page following the new claims provided below.

The applicant respectfully amends the original abstract as follows:

~~The present invention relates to an induction trash can circuit standby power-saving method. An induction trash can circuit is provided. The~~ An induction trash can circuit ~~comprises~~ includes an active infrared sensor, a microcontroller, a driving circuit and a motor for controlling the opening and closing of a lid. The power-saving method is achieved through the following ~~manners that~~ steps: in a standby state, the microcontroller controls the active infrared sensor to emit an infrared pulse signal to an induction area; if no obstacle exit in the induction area, the active infrared sensor outputs no signals, the program of the microcontroller immediately enters a sleep state; after the program of the microcontroller sleeps for a period of time, a watchdog timer in the microcontroller wakes up the microcomputer controller to make the microcontroller re-enter a working state; and if the microcontroller is in a standby state, the above process is repeated. ~~With the induction trash can circuit standby power-saving method of the invention adopted, the standby current of the induction trash can be greatly reduced, the service life of a battery can be improved, an excellent power-saving effect can be achieved, the use cost of a user is reduced, and pollution caused by used batteries can be decreased.~~

CLAIM AMENDMENTS

Claims 1-5 (canceled).

Claim 6 (currently amended): A power-saving method for an induction trash can circuit, comprising the steps of:

controlling ~~the~~ an active infrared sensor to emit an infrared pulse signal to ~~the~~ an induction area by a microcontroller in a standby state;

setting ~~the~~ a microcontroller into a sleep state if no reflection output signal is received from the active infrared sensor, wherein in the standby state, the microcontroller controls the active infrared sensor to emit the infrared pulse signal, wherein in the sleep state, the microcontroller cuts off a power of the active infrared sensor; or

remaining the microcontroller in ~~the~~ a working state if a reflection output signal is received from the active infrared sensor and controlling ~~the~~ a driving circuit to drive ~~the~~ a motor to rotate forward to open ~~the~~ a lid of the induction trash can, delaying for a few seconds after the motor has driven the lid to open, controlling the driving circuit to drive the motor to rotate backward to close the lid, and setting the microcontroller into the sleep state after the lid is closed; and

after a preset time, via a watchdog timer, waking up the microcontroller from the sleep state to the working state ~~by the watchdog timer disposed therein after a preset time~~, so as to have the microcontroller reenter the working state and repeat the above steps under the standby state.

Claim 7 (currently amended): The power-saving method, as recited in claim 6, further comprising the steps of:

cutting off the power supply of the active infrared sensor when the microcontroller enters the sleep state; and

restoring the power supply of the active infrared sensor, delaying for a preset threshold time for the active infrared sensor to enter a stable working state, and controlling the active infrared sensor to emit ~~an~~ the infrared pulse signal to the induction area when the microcontroller is in ~~a~~ the standby state.

Claim 8 (previously presented): The power-saving method, as recited in claim 6, wherein the preset time is between 100 ms and 500 ms.

Claim 9 (previously presented): The power-saving method, as recited in claim 7, wherein the preset time is between 100 ms and 500 ms.

Claim 10 (previously presented): The power-saving method, as recited in claim 7, wherein the preset threshold time is between 2 ms and 50 ms.

Claim 11 (previously presented): The power-saving method, as recited in claim 9, wherein the preset threshold time is between 2 ms and 50 ms.

Claim 12 (previously presented): The power-saving method, as recited in claim 6, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 13 (previously presented): The power-saving method, as recited in claim 7, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 14 (previously presented): The power-saving method, as recited in claim 8, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 15 (previously presented): The power-saving method, as recited in claim 9, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 16 (previously presented): The power-saving method, as recited in claim 10, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

Claim 17 (previously presented): The power-saving method, as recited in claim 11, wherein the induction area is arranged above the induction window that is located on the front can edge of the trash can.

REMARKS-General

1. The amended independent claim 6 incorporates all structural limitations of the original claim 6 and includes further limitations previously brought forth in the disclosure. No new matter has been included. All amended claims 6-17 are submitted to be of sufficient clarity and detail to enable a person of average skill in the art to make and use the instant invention, so as to be pursuant to 35 U.S.C. §112.

2. With regard to the rejection of record based on prior art, Applicant will advance arguments to illustrate the manner in which the invention defined by the amended claims is patentably distinguishable from the prior art of record. Reconsideration of the present application is requested.

Response to Objection of Claims 8-17

3. The Examiner objected claims 8 and 9 because of duplicate claims, claims 10 and 11 because of duplicate claims, and claims 12-17 because of duplicate claims.

4. The applicant respectfully submits that the body of claims in claims 8 and 9 are identical. However, the dependencies of claims 8 and 9 are different. Claim 8 is depended on Claim 6 while Claim 9 is depended on Claim 7. Therefore, the scopes of claims 8 and 9 are different.

5. Likewise, claims 10 and 11 are depended on claims 7 and 9 respectively, therefore, the scopes of claims 10 and 11 are different. Claims 12-17 are depended on claims 6-11 respectively, therefore, the scopes of claims 12-17 are different.

6. The applicant respectfully requests the objection of claims 8-17 be withdraw.

Response to Rejection of Claim 6 under 35 U.S.C. §112

7. The applicant submits that the amended claim 6 particularly points out and distinctly claims the subject matter of the instant invention, as pursuant to 35 U.S.C. §112.

Response to Rejection of Claims 6-17 under 35 U.S.C. §102

8. The Examiner rejected claims 7-17 as being anticipated by Yang et al. (US 2011/0220648). Pursuant to 35 U.S.C. §102, "(a) NOVELTY; PRIOR ART.—A person shall be entitled to a patent unless—

(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or

(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention."

9. In view of 35 U.S.C. §102 (a)(1), it is apparent that a person shall not be entitled to a patent when his or her claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.

10. The applicant respectfully submits that Yang et al and the claimed invention in the instant application are **not the same invention** according to the fact that Yang et al does not read upon the instant invention and the independent claim 6 of the instant invention does not read upon Yang et al too. For a reference to anticipate, it must disclose every single element of the claim. As stated in MPEP§2131, a claim is anticipated only if each and every element as set forth in the claim is found either expressly or inherently described in a single prior art reference. Verdegaal Bros v. Union Oil Co., of California, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

11. Yang et al merely discloses a trash can comprising a motor and gear assembly configured to move a lid between an opened position and a closed position, a plurality of position detectors, a light emitter to transmit a light signal, a micro controller configured to control the operation of the lid.

12. Yang et al further discloses, in Para [0103], "the micro controller 120 can enter **a nap mode** so as to minimize the power consumption. This nap mode can be any type

of mode for reduced power operation. For example, during the nap mode operation, neither the motor driver 128 nor the position detectors 68, 70 need to operate or be provided with any power whatsoever".

13. Yang et al further discloses, in Para [0115]-Para [0616], "it can be determined if a sleep time or nap timer has elapsed. If it is determined that the timer has not elapsed, the control routine 190 can move on to operation block 196", and "not emit any light signals from the emitters 92 until the timer has elapsed". In Para [0117]-Para [0118], "it is determined that the sleep timer has elapsed, a light signal can be emitted by the light emitter 92". In other words, when the timer has not elapsed, the light emitter 92 will not emit the light signal. Once the timer has elapsed, the light emitter 92 will emit the light signal.

14. In other words, Yang et al does not disclose any power saving method for the trash can circuit to configure the trash can among the working state, the standby state, and the sleep state, and that Yang et al fails to disclose each and every element as a whole in the independent claim 1 as amended of the instant invention. Apparently, Yang et al fails to anticipate the following distinctive features of the instant invention.

(a) Regarding the amended claim 6, Yang et al fails to anticipate three different states of the microcontroller, i.e. the working state, the standby state, and the sleep state. As it is mentioned above, Yang et al merely teaches two modes, i.e. working mode and nap mode. The working mode is that the light emitter 92 will emit the light signal. The nap mode is that the light emitter 92 will not emit the light signal.

The Examiner pointed out that, in page 6, the touchless trash can is well known in the art and the power saving by intermittently enabling/disenabling a signal receiver module when a microprocessor is in a sleep mode. The applicant respectfully submits that the conventional trash cans, including Yang et al and US 2018/0159634, are ONLY configured to set the microprocessor between a normal mode (working mode) and a sleep mode. That is, the signal receiver module is activated in the normal mode for detection and is deactivated in the sleep mode for saving energy. None of the cited arts includes three different states of the microcontroller as claimed in the instant invention.

In view of the instant invention, in the standby state as disclosed in Para [0020], the microcontroller controls the active infrared sensor to emit the infrared pulse signal.

In the sleep state as disclosed in Para [0023], the microcontroller cuts off a power of the active infrared sensor. In other words, the standby state and the sleep state of the instant invention are different. Therefore, Yang et al fails to anticipate the standby state of the instant invention.

(b) Regarding the amended claim 6, Yang et al fails to anticipate how to switch among the working state, the standby state, and the sleep state. The applicant respectfully submits that Yang et al fails to anticipate:

(i) the microcontroller moves between the working state and the standby state when the active infrared sensor is remained being powered for emitting the light signal. Yang et al merely teaches the controller moves between the working mode and the nap mode by determining the detector being powered or not.

(ii) the microcontroller moves between the standby state and the sleep state by determining whether the active infrared sensor is powered or not. Yang et al merely discloses one single nap mode at an idle position of the trash can.

(ii) the microcontroller moves to the working state from the sleep state. Yang et al merely discloses one single nap mode at an idle position of the trash can.

(c) Regarding the amended claim 6, Yang et al is silent regarding any **watchdog timer** to move the microcontroller moves to the working state from the sleep state **under the standby state**. The Examiner alleges that the nap timer as taught by Yang et al is equivalent to the watchdog timer of the instant invention. The applicant respectfully disagrees. The nap timer as taught by Yang et al is configured to move the controller between the nap mode and the working mode. On the other hand, the watchdog timer of the instant invention wakes up the microcontroller from the standby mode to the sleep mode and then to the working mode.

(d) Regarding claim 7, Yang et al fails to anticipate the steps of restoring the power supply of the active infrared sensor, **delaying for a preset threshold time for the active infrared sensor to enter a stable working state**, and controlling the active infrared sensor to emit the infrared pulse signal to the induction area when the microcontroller is in a standby state. Yang et al merely teaches, in Para [0116]-Para [0117], when the sleep timer has elapsed, a pulsed light signal can be emitted by the

light emitter. Therefore, Yang et al fails to how to initially power the active infrared sensor while no infrared pulse signal is generated yet. Then, by delaying the preset threshold time until the active infrared sensor enters at the stable working state, the active infrared sensor will generate the infrared pulse signal. Yang is silent regarding such configuration.

(e) Regarding claims 8-9, Yang et al fails to anticipate that **the preset time is between 100 ms and 500 ms**. The Examiner alleges this preset time is a design choice. The applicant respectfully disagrees. The applicant respectfully submits that the preset time refers to the countdown time of the watchdog timer of the instant invention to wake up the microcontroller from the sleep state to the working state. The preset time is an optimized time to wake up the microcontroller while being energy effective. If the preset time is too short, the induction trash can circuit will waste unnecessary energy. It the preset time is too long, the response of the microcontroller will be delayed.

(f) Regarding claims 10-11, Yang et al fails to anticipate that **the preset threshold time is between 2 ms and 50 ms**. The Examiner alleges this preset threshold time is a design choice. The applicant respectfully disagrees. The applicant respectfully submits that the preset threshold time refers to the time requiring for the active infrared sensor entering back to the stable working state. In fact, Yang et al is silent regarding how to restore the power of the position detector and how to delay the operation of the position detector until the position detector reaches the stable working state for light signal generation as claimed in the instant invention.

15. Accordingly, applicant submits that claims 6-11 are not anticipated by Yang et al and are therefore allowable.

16. In additions, claims 12-17 depends, either directly or indirectly, from independent claim 6, and are therefore allowable based on their respective dependence from independent claim 6, which are believed to be allowable.

The Cited but Non-Applied References

17. The cited but not relied upon references have been studied and are greatly appreciated, but are deemed to be less relevant than the relied upon references.

18. In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration and withdrawal of the rejection are requested. Allowance of claims 6 to 17 at an early date is solicited.

19. Should the Examiner believe that anything further is needed in order to place the application in condition for allowance, he is requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

/Raymond Y. Chan/

Raymond Y. Chan
Reg. Nr.: 37,484
108 N. Ynez Ave.
Suite 128
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Raymond Y. Chan
Reg. Nr. 37,484

/Raymond Y. Chan/
(Signature)

Induction Trash Can Circuit Standby Power-Saving Method

ABSTRACT OF THE DISCLOSURE

An induction trash can circuit includes an active infrared sensor, a microcontroller, a driving circuit and a motor for controlling the opening and closing of a lid. The power-saving method is achieved through the following steps: in a standby state, the microcontroller controls the active infrared sensor to emit an infrared pulse signal to an induction area; if no obstacle exit in the induction area, the active infrared sensor outputs no signals, the program of the microcontroller immediately enters a sleep state; after the program of the microcontroller sleeps for a period of time, a watchdog timer in the microcontroller wakes up the microcomputer controller to make the microcontroller re-enter a working state; and if the microcontroller is in a standby state, the above process is repeated.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	16/315,652	Examiner:	Suryawanshi, Suresh
Applicant(s):	Xin WANG	Group Art Unit:	2116
Filing Date:	01/06/2019	Att'y Docket No.:	USP10302A-NSG

Title: Induction Trash Can Circuit Standby Power-Saving Method

Date: September 8, 2020

PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. 1.136

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir.:

It is respectfully requested that an Extension of Time for the period indicated below be granted in accordance with the provisions of 37 C.F.R. 1.136 to take the action required in the application identified in caption, as reflected by the papers submitted.

	Fee	Small Entity Fee	Micro Entity Fee
☒ First Month	$200.00	$100.00	$50.00
☐ Second Month	$600.00	$300.00	$150.00
☐ Third Month	$1,400.00	$700.00	$350.00
☐ Fourth Month	$2,200.00	$1,100.00	$550.00
☐ Fifth Month	$3,000.00	$1,500.00	$750.00

*Small Entity TOTAL: $ 100.00

☒ Payment in the amount of the above total fee is attached.
This amount is believed to be correct; however, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 502111. A duplicate copy of this letter is attached.

☒ Please charge any fee which may be required to Deposit Account No.502111 in the name of David and Raymond Patent Firm. A duplicate copy of this letter is attached.

Respectfully submitted,

/Raymond Y. Chan/

Raymond Y. Chan
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108 N. Ynez Avenue, Suite 128
Monterey Park, CA 91754
Tel.: (626) 571 9812/ Fax: (626) 571 9813

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Reg. Nr. 37,484

/Raymond Y. Chan/
(Signature)

Electronic Patent Application Fee Transmittal

Application Number:	16315652
Filing Date:	06-Jan-2019
Title of Invention:	Induction Trash Can Circuit Standby Power-saving Method
First Named Inventor/Applicant Name:	Xin WANG
Filer:	Raymond Yat Chan/Michael Lee
Attorney Docket Number:	USP10302A-NSG

Filed as Small Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	2251	1	100	100
Miscellaneous:				
		Total in USD ($)		**100**

Electronic Acknowledgement Receipt	
EFS ID:	40555005
Application Number:	16315652
International Application Number:	
Confirmation Number:	6872
Title of Invention:	Induction Trash Can Circuit Standby Power-saving Method
First Named Inventor/Applicant Name:	Xin WANG
Customer Number:	30265
Filer:	Raymond Yat Chan/Michael Lee
Filer Authorized By:	Raymond Yat Chan
Attorney Docket Number:	USP10302A-NSG
Receipt Date:	14-SEP-2020
Filing Date:	06-JAN-2019
Time Stamp:	21:53:29
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$100
RAM confirmation Number	E20209DL54192927
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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	Amendment/Req. Reconsideration-After Non-Final Reject	USP10302AmdACover.pdf	76005 8c911459dd5d993ea66ca1c49bc4c2777ce9c28a	no	1
Warnings:					
Information:					
2	Applicant Arguments/Remarks Made in an Amendment	USP10302AmdASpecification.pdf	106273 f5aeac5d6012ecde95dae8b97219beaa3a59a10d	no	1
Warnings:					
Information:					
3	Claims	USP10302AmdAClaims.pdf	101943 d8bf3328e768a6ff2982225fd2ce1b1e16d8de5e	no	2
Warnings:					
Information:					
4	Applicant Arguments/Remarks Made in an Amendment	USP10302AmdARemarks.pdf	137783 a88aa92a55a12fb3243979e67338d22ef1d4e2a3	no	6
Warnings:					
Information:					
5	Abstract	USP10302AppendedAbstract.pdf	49771 5c606e2a71802e2c6aa84589edf3d130dcf80380	no	1
Warnings:					
Information:					
6	Extension of Time	USP10302extot.pdf	160524 54a8b0b2b6b2e0d898d76196e3a5084326b17307	no	1
Warnings:					
Information:					

7	Fee Worksheet (SB06)	fee-info.pdf	30743 bdbf28ffa852bf6fcc576f27a37f96446c5ff9ff	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	663042	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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NOTICE OF ALLOWANCE AND FEE(S) DUE

30265 7590 10/22/2020

DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

EXAMINER
SURYAWANSHI, SURESH

ART UNIT	PAPER NUMBER
2116	

DATE MAILED: 10/22/2020

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/315,652	01/06/2019	Xin WANG	USP10302A-NSG	6872

TITLE OF INVENTION: Induction Trash Can Circuit Standby Power-saving Method

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	01/22/2021

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

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EKO v. Nine Stars, IPR2025-01369

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

30265 7590 10/22/2020
DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/315,652	01/06/2019	Xin WANG	USP10302A-NSG	6872

TITLE OF INVENTION: Induction Trash Can Circuit Standby Power-saving Method

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	01/22/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
SURYAWANSHI, SURESH	2116	700-083000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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EKO v. Nine Stars, IPR2025-01369

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/315,652	01/06/2019	Xin WANG	USP10302A-NSG	6872

30265 7590 10/22/2020

DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

EXAMINER	
SURYAWANSHI, SURESH	
ART UNIT	**PAPER NUMBER**
2116	

DATE MAILED: 10/22/2020

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Petitioner Ex 1002, p. 183
EKO v. Nine Stars, IPR2025-01369

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. 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 1.14. This collection is estimated to take 30 minutes 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
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.

Notice of Allowability	Application No. 16/315,652	Applicant(s) WANG et al.	
	Examiner SURESH K SURYAWANSHI	Art Unit 2116	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to amendments filed on 9/14/20.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 6-17 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some *c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/SURESH SURYAWANSHI/
Primary Examiner, Art Unit 2116

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

1. Claims 6-17 are presented for examination.

Reasons for Allowance

2. The following is an examiner's statement of reasons for allowance:

The prior art of record does not teach or suggest individually or in combination about a power saving method for an induction trash can circuit with a microcontroller having three different power states (standby state, sleep state, and working state) and a watchdog timer for waking up the microcontroller from the sleep state to the working state so as to have the microcontroller reenter the working state and repeat the steps performed under the standby state.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SURESH K SURYAWANSHI whose telephone number is (571)272-3668. The examiner can normally be reached on M-F 8:30-5:00 PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth M Lo can be reached on 5712729774. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SURESH SURYAWANSHI/
Primary Examiner, Art Unit 2116

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/315,652	WANG et al.
	Examiner	Art Unit
	SURESH K SURYAWANSHI	2116

CPC - Searched*		
Symbol	**Date**	**Examiner**
G05B 19/0426	5/13/20, 5/14/20	SS
Search updated	10/19/2020	SS

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
700	83	5/13/20, 5/14/20	SS
Search updated		10/19/2020	SS

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
EAST; USPAT; US-PGPUB; EPO; JPO; IBM_TDB; NPL	5/13/20, 5/14/20	SS
Search updated and claim language searched in US-PGPUB; NPLSearch (Google and IP.com)	10/19/2020	SS

/SURESH SURYAWANSHI/ Primary Examiner, Art Unit 2116	

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EKO v. Nine Stars, IPR2025-01369

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/315,652	WANG et al.
	Examiner	Art Unit
	SURESH K SURYAWANSHI	2116

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
220 / B65F	211 / 1/1638	5/13/20, 5/14/20	SS
340 / G08B	545.3 / 13/18	5/13/20, 5/14/20	SS
250 / H04N	338.1 / 5/33	5/13/20, 5/14/20	SS
Search updated		10/19/2020	SS

/SURESH SURYAWANSHI/ Primary Examiner, Art Unit 2116	

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EKO v. Nine Stars, IPR2025-01369

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/315,652	WANG et al.
	Examiner	**Art Unit**
	SURESH K SURYAWANSHI	2116

CPC						
Symbol					**Type**	**Version**
G05B	/	19	/	0423	F	2013-01-01
G06F	/	1	/	3234	I	2013-01-01
B65F	/	1	/	00	I	2013-01-01
G05B	/	19	/	042	I	2013-01-01
B65F	/	2210	/	168	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	12	
/SURESH SURYAWANSHI/ Primary Examiner, Art Unit 2116	19 October 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20201019

Petitioner Ex 1002, p. 190
EKO v. Nine Stars, IPR2025-01369

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/315,652	WANG et al.
	Examiner	Art Unit
	SURESH K SURYAWANSHI	2116

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G05B	/	19	/	042

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
700	83

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	12	
/SURESH SURYAWANSHI/ Primary Examiner, Art Unit 2116	19 October 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20201019

Petitioner Ex 1002, p. 191
EKO v. Nine Stars, IPR2025-01369

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/315,652	WANG et al.
	Examiner	Art Unit
	SURESH K SURYAWANSHI	2116

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1	5	10												
	2	6	11												
	3	7	12												
	4	8	13												
	5	9	14												
1	6	10	15												
2	7	11	16												
3	8	12	17												
4	9														

NONE (Assistant Examiner) (Date)	Total Claims Allowed: 12	
/SURESH SURYAWANSHI/ Primary Examiner, Art Unit 2116 (Primary Examiner)	19 October 2020 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20201019

Petitioner Ex 1002, p. 192
EKO v. Nine Stars, IPR2025-01369

IQQueryQuickExport-202010191638

Main Concept Text
==========
"induction trash can"

Concept Modifiers (2)
==========
2. More Like Text: standby

1. More Like Text: power-saving

(No Filters)
==========

Options
=======
De-dup: None
Cut-off: None
Sort: Relevance

Content: Non-Patent Literature (25)
==========
IEEE Xplore Publications: IEEE Periodicals
IEEE Xplore Publications: IEEE Conferences
IEEE Xplore Publications: IEEE Standards
IEEE Xplore Publications: IEEE Early Access
IEEE Xplore Publications: IET Periodicals
IEEE Xplore Publications: IET Conferences
IEEE Xplore Publications: SMPTE Periodicals
IEEE Xplore Publications: SMPTE Conferences
IEEE Xplore Publications: SMPTE Standards
IEEE Xplore Publications: MIT Press eBooks
IEEE Xplore Publications: Wiley-IEEE eBooks
IEEE Xplore Publications: IBM Periodicals
IEEE Xplore Publications: URSI Periodicals
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IP.com Prior Art Database: The IP.com Journal
IP.com Prior Art Database: Internet Society RFC
IP.com Prior Art Database: IBM TDB Archive
IP.com Prior Art Database: Legacy Journals
IP.com Prior Art Database: Software Patent Institute
OnePetro.org: Periodicals at OnePetro.org
OnePetro.org: Conferences at OnePetro.org

OnePetro.org: Standards at OnePetro.org
Other Literature: IBM Redbooks
Other Literature: PubMed Central

Petitioner Ex 1002, p. 194
EKO v. Nine Stars, IPR2025-01369

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	5	induction ADJ (trash waste garbage) ADJ (can collector bin)	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 11:51 AM
L2	359	induction ADJ (trash waste garbage) ADJ (can collector bin)	FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 11:53 AM
L3	1	(power ADJ saving power$1saving) SAME induction ADJ (trash waste garbage) ADJ (can collector bin)	FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 11:54 AM
L4	7	(power ADJ saving power$1saving) AND induction ADJ (trash waste garbage) ADJ (can collector bin)	FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 11:55 AM
L5	43774	(trash waste garbage) ADJ (can collector bin)	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 11:57 AM
L6	113	(power$1saving power ADJ (sav$3 consev$5 consum$5 reduc$4)) SAME (trash waste garbage) ADJ (can collector bin)	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 11:59 AM
L7	47	(power$1saving power ADJ (sav$3 consev$5 consum$5 reduc$4)) WITH (trash waste garbage) ADJ (can collector bin)	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 12:02 PM
L8	230	(power$1saving power ADJ (sav$3 consev$5 consum$5 reduc$4)) WITH (trash waste garbage) ADJ (can collector bin)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 12:14 PM
L9	8	(power$1saving power ADJ (sav$3 consev$5 consum$5 reduc$4)) WITH (trash waste garbage) ADJ (can collector bin) AND (standby stand$1by)	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 12:15 PM
L10	17	(power$1saving power	US-PGPUB; USPAT;	OR	ON	ON	2020/10/19

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EKO v. Nine Stars, IPR2025-01369

		ADJ (sav$3 consev$5 consum$5 reduc$4)) SAME (trash waste garbage) ADJ (can collector bin) AND (standby stand$1by)	USOCR				12:17 PM
L11	1	active ADJ infrared ADJ sensor WITH standby WITH sleep	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 12:55 PM
L12	10	active ADJ infrared ADJ sensor AND standby SAME sleep	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 12:56 PM
L13	6	active ADJ infrared ADJ sensor AND standby SAME sleep	FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 12:57 PM
L14	10	trash ADJ can WITH infrared ADJ sensor	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 01:08 PM
L15	36	trash ADJ can AND infrared ADJ sensor AND standby	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 01:09 PM
L16	17	trash ADJ can AND infrared ADJ sensor AND standby	FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 01:10 PM
L17	228	trash ADJ can AND infrared ADJ sensor	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 01:11 PM
L18	18	trash ADJ can SAME infrared ADJ sensor	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 01:11 PM
L19	93	trash ADJ can SAME infrared ADJ sensor	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 01:12 PM
L20	31	trash ADJ can WITH power WITH lid	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 01:19 PM
L21	34	trash ADJ can WITH power WITH lid	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 01:29 PM
L22	319	standby SAME watchdog ADJ timer	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 01:54 PM
L23	192	standby SAME watchdog ADJ timer AND power ADJ (sav$3 conserv$5 consum$5 reduc$4)	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 01:55 PM
L24	52	standby SAME watchdog ADJ timer AND power ADJ (sav$3 conserv$5 consum$5 reduc$4) AND infrared	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 01:55 PM
L25	50	standby SAME watchdog	FIT (CN, FR, WO); FPRS;	OR	ON	ON	2020/10/19

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EKO v. Nine Stars, IPR2025-01369

		ADJ timer AND power ADJ (sav$3 conserv$5 consum$5 reduc$4) AND infrared	EPO; JPO; DERWENT; IBM_TDB				02:02 PM
L26	86	infrared ADJ sensor WITH lid AND power ADJ (sav$3 conserv$5 consum$5 reduc$4)	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 02:20 PM
L27	1	infrared ADJ sensor WITH lid AND power ADJ (sav$3 conserv$5 consum$5 reduc$4) AND watchdog	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 02:20 PM
L28	3	infrared ADJ sensor WITH lid AND power ADJ (sav$3 conserv$5 consum$5 reduc$4) AND watchdog	FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 02:20 PM
L29	2	infrared ADJ sensor WITH lid AND power ADJ (sav$3 conserv$5 consum$5 reduc$4) AND standby	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 02:21 PM
L30	4	infrared ADJ sensor WITH lid AND power ADJ (sav$3 conserv$5 consum$5 reduc$4) AND standby	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 02:21 PM
L31	32	standby ADJ (state mode) WITH control$4 WITH infrared ADJ sensor	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 02:23 PM
L32	491	standby ADJ (state mode) WITH control$4 WITH infrared ADJ sensor	FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 02:38 PM
L33	1	sleep ADJ (state mode) WITH (cut$4 trun$4) ADJ off WITH power WITH infrared ADJ sensor	US-PGPUB; USPAT; USOCR	OR	ON	ON	2020/10/19 02:39 PM
L34	22	sleep ADJ (state mode) WITH (cut$4 trun$4) ADJ off WITH power WITH infrared ADJ sensor	FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/10/19 02:40 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

Petitioner Ex 1002, p. 197
EKO v. Nine Stars, IPR2025-01369

Bibliographic Data

Application No: 16/315,652

Foreign Priority claimed: (•) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No [✓] Met After Allowance

Verified and Acknowledged: /SURESH SURYAWANSHI/ (Examiner's Signature) | S.S (Initials)

Title: Induction Trash Can Circuit Standby Power-saving Method

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
01/06/2019	700	2116	USP10302A-NSG
RULE			

APPLICANTS

Fujian Nashida Electronic Incorporated Company, Fuzhou, Fujian, CHINA

INVENTORS

Xin WANG, Fuzhou, CHINA

Jiangqun CHEN, Fuzhou, CHINA

Zhou LIN, Fuzhou, CHINA

CONTINUING DATA

This application is a 371 of PCT/CN2017/093119 07/17/2017

FOREIGN APPLICATIONS

CHINA CN201710223843.1 04/07/2017

PCT/CN2017/093119 07/17/2017

IF REQUIRED, FOREIGN LICENSE GRANTED**

05/02/2019

**** SMALL ENTITY ****

STATE OR COUNTRY

CHINA

ADDRESS

DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754
UNITED STATES

FILING FEE RECEIVED

$790

IQQueryQuickExport-202010191634

Main Concept Text
==========
"induction trash can"

Concept Modifiers (3)
==========
3. More Like Text: watchdog

2. More Like Text: standby

1. More Like Text: power-saving

Filters (1)
==========
Earliest Priority Date: To 2017-04-06

Options
=======
De-dup: None
Cut-off: None
Sort: Relevance

Content: Patent Publications (164)
==========
US Patents
US Designs
US Applications
EPO Patents
EPO Applications
China Patents
China Applications
Japan Patents
Japan Applications
Korea Patents
Korea Applications
WIPO Applications
Argentina Patents
Argentina Applications
Brazil Patents
Brazil Applications
Canada Patents
Canada Applications

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EKO v. Nine Stars, IPR2025-01369

Chile Patents
Chile Applications
Colombia Applications
Costa Rica Applications
Cuba Patents
Cuba Applications
Dominican Republic Applications
Ecuador Patents
Ecuador Applications
El Salvador Applications
Guatemala Applications
Honduras Applications
Mexico Patents
Mexico Applications
Nicaragua Patents
Panama Applications
Peru Applications
Trinidad & Tobago Patents
Uruguay Applications
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Belarus Patents
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Czechoslovakia Applications
Denmark Patents
Denmark Applications
Estonia Patents
Estonia Applications
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Germany Patents
Germany Applications
Great Britain Patents
Great Britain Applications
Greece Patents

Greece Applications
Hungary Patents
Hungary Applications
Iceland Patents
Iceland Applications
Ireland Patents
Ireland Applications
Italy Patents
Italy Applications
Latvia Patents
Latvia Applications
Lithuania Patents
Lithuania Applications
Luxembourg Patents
Malta Patents
Monaco Patents
Montenegro Patents
Montenegro Applications
Netherlands Patents
Netherlands Applications
Norway Patents
Norway Applications
Poland Patents
Poland Applications
Portugal Patents
Portugal Applications
Republic of Moldova Patents
Republic of Moldova Applications
Romania Patents
Romania Applications
San Marino Patents
San Marino Applications
Serbia Patents
Serbia Applications
Slovakia Patents
Slovakia Applications
Slovenia Patents
Spain Patents
Spain Applications
Sweden Patents
Sweden Applications
Switzerland Patents
Switzerland Applications
Ukraine Patents
Yugoslavia/Serbia and Montenegro Patents
Yugoslavia/Serbia and Montenegro Applications
Armenia Patents
Australia Patents

Australia Applications
Cyprus Patents
Gulf Cooperation Council Patents
Hong Kong Patents
India Patents
India Applications
Indonesia Patents
Indonesia Applications
Israel Applications
Jordan Patents
Kyrgyzstan Patents
Macao Applications
Malaysia Patents
Mongolia Patents
New Zealand Patents
Philippines Patents
Philippines Applications
Saudi Arabia Patents
Singapore Patents
Singapore Applications
Taiwan Patents
Taiwan Applications
Tajikistan Patents
Tajikistan Applications
Thailand Applications
Uzbekistan Patents
Vietnam Patents
Algeria Patents
ARIPO Patents
ARIPO Applications
Egypt Patents
Kenya Patents
Malawi Patents
Morocco Patents
Morocco Applications
OAPI Patents
South Africa Patents
Tunisia Applications
Zambia Patents
Zimbabwe Patents
EAPO Patents
EAPO Applications
Georgia Patents
Georgia Applications
Kazakhstan Patents
Kazakhstan Applications
Russia Patents
Russia Applications

IQQueryQuickExport-202010191634

Turkey Patents
Turkey Applications

Petitioner Ex 1002, p. 203
EKO v. Nine Stars, IPR2025-01369

Web Search History

date, time	web site	search string
10/19/2020 12:39:10 PM	Google	"induction trash can"
10/19/2020 12:39:27 PM	Google	"induction trash can" "power saving"
10/19/2020 12:40:08 PM	Google	"induction trash can" microcontroller
10/19/2020 12:40:38 PM	Google Scholar	"trash can" "power saving"
10/19/2020 12:40:46 PM	Google Scholar	"induction trash can" "power saving"
10/19/2020 12:41:04 PM	Google Scholar	"trash can" "power saving" standby
10/19/2020 12:41:25 PM	Google Scholar	"trash can" "power saving" standby sleep
10/19/2020 12:43:06 PM	Google Scholar	"garbage can" "power saving" standby sleep
10/19/2020 12:45:16 PM	Google Scholar	"infrared sensor" "power saving" standby sleep
10/19/2020 12:45:30 PM	Google Scholar	"infrared sensor" "power saving" standby sleep microcontroller
10/19/2020 12:46:00 PM	Google Scholar	"active infrared sensor" "power saving" standby sleep microcontroller
10/19/2020 12:47:10 PM	Google Scholar	"active infrared sensor" standby sleep microcontroller
10/19/2020 12:47:28 PM	Google Scholar	"active infrared sensor" standby sleep
10/19/2020 1:07:03 PM	Google Scholar	"trash can" infrared
10/19/2020 1:07:16 PM	Google Scholar	"trash can" "infrared sensor"
10/19/2020 1:07:36 PM	Google Scholar	"trash can" "infrared sensor" standby
10/19/2020 1:31:17 PM	Google Scholar	"trash can" "infrared sensor" standby timer

Petitioner Ex 1002, p. 204
EKO v. Nine Stars, IPR2025-01369

date, time	web site	search string
10/19/2020 1:31:32 PM	Google Scholar	"trash can" "infrared sensor" standby watchdog

Petitioner Ex 1002, p. 205
EKO v. Nine Stars, IPR2025-01369

USPTO
JAN 21 2021
PATENT & TRADEMARK OFFICE

In The United States Patent and Trademark Office

Application Number:	16/315,652	Examiner:	Suryawanshi, Suresh
First Named Inventor:	Xin Wang	Group Art Unit:	2116
Filing Date:	01/06/2019	Atty's Docket No.:	USP10302A-NSG

Title: Induction Trash Can Circuit Standby Power-Saving Method

Date: November 9, 2020

Submission of Issue Fee

MS Issue Fee
Commissioner for Patents
Alexandria, VA 22313 1450

Sir:

In response to the Notice of Allowance and Fee(s) Due dated **10/22/2020**, the applicant respectfully submits a payment of Issue Fee and Publication Fee.

☒ A check in the amount of **$600.00** is enclosed herewith for the payment.

☐ The Director is hereby authorized by charging the required fee(s) in the amount of $_____ to the Deposit Account Number 502111 in the name of David and Raymond Patent Firm.

☒ The fees submitted are believed to be correct. However, the Director is hereby authorized to charge the additional required fee(s) or credit any overpayment to Deposit Account Number 502111 in the name of David and Raymond Patent Firm.

☒ Please associate the customer number **30265** with the above identified application. The Correspondence Address and Fee Address are updated to read as: 108 N. Ynez Avenue, Suite 128, Monterey Park, CA 91754, US.

☐ Others:

Please accept the payment(s) and/or document(s) and proceed with the issuance of the patent as soon as possible. Thank you for your assistance.

Respectfully submitted,

Raymond Y. Chan
Reg. No.: 37,484
108 N. Ynez Avenue, Suite 128
Monterey Park, CA 91754
Tel.: (626) 571 9812/ Fax: (626) 571 9813

Certification of Mailing or Transmission

I hereby certify that this correspondence is being deposited with the United States Postal Service with proper postage as first class mail in an envelope addressed to: "MS Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" or being facsimile transmitted to the USPTO on the date shown below.

Signature: _____ Date: 01/19/2021

Name in print: Raymond Y. Chan

Best Available Copy

IDS

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

30265 7590 10/22/2020
DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

OPAP AKIMA-S JAN 21 2021 PATENT & TRADEMARK OFFICE

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Raymond Y. Chan	(Typed or printed name)
	(Signature)
01/19/2021	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/315,652	01/06/2019	Xin WANG	USP10302A-NSG	6872

TITLE OF INVENTION: Induction Trash Can Circuit Standby Power-saving Method

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$600	$0.00	$0.00	$600	01/22/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
SURYAWANSHI, SURESH	2116	700-083000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Raymond Y. Chan
David and Raymond Patent Firm
2
3

3 ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE	(B) RESIDENCE: (CITY and STATE OR COUNTRY)
Nine Stars Group (U.S.A.) Inc.	Chino, CA, USA
Fujian Nashida Electronic Incorporated Company	Fuzhou, Fujian, China

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☐ Electronic Payment via EFS-Web ☒ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 502111

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date 01/19/2021

Typed or printed name Raymond Y. Chan Registration No. 37,484

PTOL-85 Part B (08-18) Approved for use through 01/31/2020 OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Petitioner Ex 1002, p. 207
EKO v. Nine Stars, IPR2025-01369

United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :C44690

Sale Accounting Date:01/25/2021

Sale Item Reference Number	Effective Date
16315652	01/21/2021

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20211O752543334	2501	UTILITY APPL ISSUE FEE	$600.00	Check

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/315,652	02/23/2021	10928796	USP10302A-NSG	6872

30265 7590 02/03/2021

DAVID AND RAYMOND PATENT FIRM
108 N. YNEZ AVE., SUITE 128
MONTEREY PARK, CA 91754

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 46 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Xin WANG, Fuzhou, CHINA;
Fujian Nashida Electronic Incorporated Company, Fuzhou, Fujian, CHINA
Jiangqun CHEN, Fuzhou, CHINA;
Zhou LIN, Fuzhou, CHINA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

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PETITON TO ACCEPT UNINTENTIONAL DELAYED PAYMENT OF MAINTENANCE FEE (37 CFR 1.378(b))

APPLICATION #	FIRST NAMED INVENTOR	ATTORNEY DOCKET #	FILING DATE
16315652	Xin WANG	USP10302A-NSG	01/06/2019

Title of Invention

Induction Trash Can Circuit Standby Power-saving Method

In re Patent #: 10928796
Issue date: 02/23/2021}

The delay in the payment of the maintenance fee to the above-identified patent was unintentional.

PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED

(1) Petition fee under 37 CFR 1.17(m) is attached

Applicant claims the following entity status
Small

(2) Statement
The delay in the payment of the maintenance fee to this patent was unintentional

- Petitioner(s) is reminded that a delay resulting from a deliberately chosen course of action or a change in circumstance is not an unintentional delay.

- Petitioner(s) is further reminded that a person seeking reinstatement of an expired patent should not make a statement that the delay in payment of the maintenance fee was unintentional unless the entire delay was unintentional, including the period from discovery that the maintenance fee was not timely paid until payment of the maintenance fee. For example, a statement that the delay in payment of the maintenance fee was unintentional would not be proper when the patentee becomes aware of an unintentional failure to timely pay the maintenance fee and then intentionally delays filing a petition for reinstatement of the patent under 37 CFR 1.378. See MPEP 2590.

NOTE: Where the petition under 37 CFR 1.378 is filed more than two years after the date the patent expired for nonpayment of the maintenance fee, the United States Patent and Trademark Office requires an additional explanation of the circumstances

surrounding the delay that establishes the entire delay was unintentional. This requirement is in addition to the requirement to provide a statement that the entire delay was unintentional. See Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications and Patents Based on Unintentional Delay, 85 FR 12222 (March 2, 2020). See MPEP 711.03(c)(II)(C)-(F) for additional guidance on the information required to establish that the entire delay was unintentional.

Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:
An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature	Name	Registration #
/Raymond Y Chan/	Raymond Chan	37484

PETAUTO SB64.0

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Alexandria, VA 22313 - 1450
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/315,652	**04/04/2025 06:09:45 PM Z ET**	**USP10302A-NSG**

Title of Invention

Induction Trash Can Circuit Standby Power-saving Method

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	10928796
CONFIRMATION #	6872	FILED BY	Raymond Chan
PATENT CENTER #	69883068	AUTHORIZED BY	-
CUSTOMER #	30265	FILING DATE	01/06/2019
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Xin WANG

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 3605	**E202544I20426702**	**Raymond Chan**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2551	MAINTENANCE FEE DUE AT 3.5 YEARS	860.00	1	860.00
2558	PETITION FOR THE DELAYED PAYMENT OF THE FEE FOR MAINTAINING A PATENT IN FORCE, DELAY LESS THAN OR EQUAL TO TWO YEARS	904.00	1	904.00
			TOTAL AMOUNT:	**$1,764.00**

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/315,652	**04/04/2025 06:09:45 PM Z ET**	**USP10302A-NSG**

Title of Invention

Induction Trash Can Circuit Standby Power-saving Method

Application Information

APPLICATION TYPE	Utility - U.S. National Stage under 35 USC 371	PATENT #	10928796
CONFIRMATION #	6872	FILED BY	Raymond Chan
PATENT CENTER #	69883068	FILING DATE	01/06/2019
CUSTOMER #	30265	FIRST NAMED INVENTOR	Xin WANG
INTL. APPLICATION #	-	INTL. FILING DATE	-
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
petition-request.pdf	2	ePetition Request Form	27 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
petition-request.pdf	0F6143F36803ED28C05A29AF86F8BA3BA10C5AD0CACB5527 C91CED435D16DD35AE5A06DBC56CBF03B1355B65B008A100 C43F64C241D68B2D7CC6DF4AA337FE2D

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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Doc Code : PET.DEC.AUTO
Description : ePetition Grant Letter

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GRANT LETTER

APPLICATION #	DECISION DATE	DECISION ON PETITION #	ATTORNEY DOCKET NUMBER
16/315,652	04/04/2025	UNDER CFR 1.378(b)	USP10302A-NSG

Title of Invention

Induction Trash Can Circuit Standby Power-saving Method

In re Patent # **10928796**
Issue date: **02/23/2021**
Filing date: **01/06/2019**

This is an electronic decision on the petition under 37 CFR 1.378(b), filed April 04, 2025 to accept unintentional delayed payment of the 3.5 year maintenance fee for the above-identified patent.

The petition is **GRANTED.**

The maintenance fee is accepted, and the above-identified patent reinstated as of April 04, 2025. This decision also constitutes notice that the fee has been accepted. An electronic copy of the petition and this decision has been created as an entry in the Image File Wrapper. Nevertheless, petitions should print and retain an independent copy.

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

Office of Petitions