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(54) **Title**: AIRFLOW BASED MICROTURBINE POWER SUPPLY

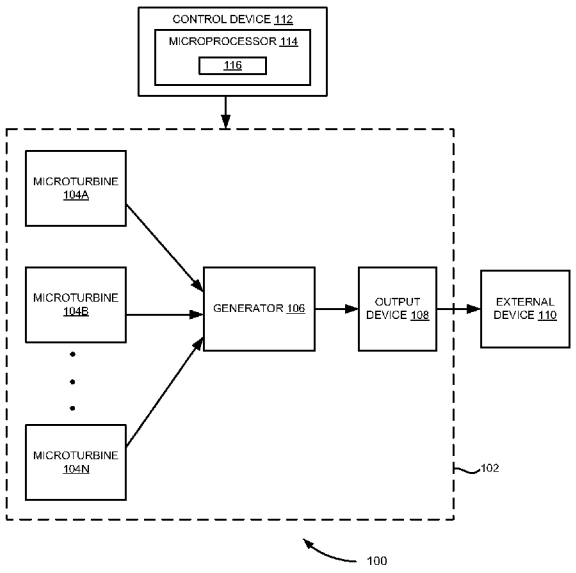


FIG. 1

(57) **Abstract**: An airflow based microturbine power supply is disclosed. In one embodiment, the airflow based microturbine power supply includes at least one microturbine configured to circulate upon receiving airflow and to convert to mechanical energy. Further, the airflow based microturbine power supply includes a generator coupled to the at least one microturbine to convert the mechanical energy of the microturbine into electrical energy via electromagnetic induction.

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AIRFLOW BASED MICROTURBINE POWER SUPPLY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims rights under 35 USC §119(e) from U.S. Application Serial No. 61/498,009 filed June 17, 2011, and under 35 U.S.C. 119(a)-(d) to Foreign Application Serial No. 2384/CHE/2012 filed in INDIA on June 15, 2012, and U.S. Application Serial No. 13/523,913 filed June 15, 2012 and the contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to turbine power supplies, more specifically to airflow based microturbine power supplies.

Brief Description of Related Art

[0003] Generally, handheld and portable electronic devices need a power source. Further, these devices require regular recharging and create a constant demand for energy. Typical power sources for these devices include batteries and solar or plug-in power supply chargers. Frequently, the batteries run out of power and must be regularly disposed of or recharged. The plug-in power supply chargers require access to a generator or power supply, while the solar power supply chargers require access to

sunlight. Furthermore, these power source solutions require the user to halt use of the device in order to recharge it.

SUMMARY OF THE INVENTION

[0004] An airflow based microturbine power supply is disclosed. According to one aspect of the present subject matter, the airflow based microturbine power supply includes at least one microturbine configured to circulate upon receiving airflow and to convert to mechanical energy. Further, the airflow based microturbine power supply includes a generator coupled to the at least one microturbine to convert the mechanical energy of the at least one microturbine into electrical energy via electromagnetic induction. Furthermore, the airflow based microturbine power supply includes an output device coupled to the generator to receive the electrical energy and transfer to an external device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The advantages and features of the present disclosure will become better understood with reference to the following detailed description and claims taken in conjunction with the accompanying drawings, wherein like elements are identified with like symbols, and in which:

[0006] **FIG. 1** is a block diagram including major components of an airflow based microturbine power supply, according to an embodiment of the present subject matter.

DETAILED DESCRIPTION OF THE INVENTION

[0007] The exemplary embodiments described herein in detail for illustrative purposes are subject to many variations in structure and design.

[0008] **FIG. 1** is a block diagram 100 including major components of an airflow based microturbine power supply 102, according to an embodiment of the present subject matter. As shown in **FIG. 1**, the block diagram 100 includes the airflow based microturbine power supply 102, an external device 110, and a control device 112. Further, the airflow based microturbine power supply 102 includes a plurality of microturbines 104A-N, a generator 106, and an output device 108. Furthermore, the control device 112 includes a microprocessor 114. In addition, the microprocessor 114 includes embedded software 116. Moreover, the plurality of microturbines 104A-N is coupled to the generator 106. For example, the plurality of microturbines 104A-N is rotatably coupled to the generator 106. Also, the output device 108 is coupled to the external device 110. Further, the control device 112 is coupled to the airflow based microturbine power supply 102. In one exemplary implementation, the control device 112 controls the operation of the airflow based microturbine power supply 102.

[0009] In one embodiment, at least one of the plurality of microturbines 104A-N is configured to circulate upon receiving airflow and to convert to mechanical energy. For example, the airflow based microturbine power supply 102 is configured to attach to a surface, such as a person, an article of clothing, a weapon, a handheld device and the like. For example, the airflow is generated from movements of body of the person, the

handheld devices, the weapons, the article of clothing and the like. In one exemplary implementation, the at least one of the plurality of microturbines 104A-N spins as the airflow passes over and through the at least one of the plurality of microturbines 104A-N. For example, the airflow based microturbine power supply 102 utilizes kinetic energy of the handheld devices, weapons, or other devices used by a soldier to power the at least one of the plurality of microturbines 104A-N. In another exemplary implementation, an airtight chamber substantially surrounding the at least one of the plurality of microturbines 104A-N captures the airflow generated from the movements of body of the person, the handheld devices, the weapons, the article of clothing and the like. Within the airtight chamber, any motion that compresses one area of the airtight chamber creates airflow throughout the rest of the airtight chamber. For example, the airtight chamber is an outfit worn by the person, a casing, and/or a cover for a device. The airtight chamber is further configured to direct the airflow towards the at least one of the plurality of microturbines 104A-N to cause the at least one of the plurality of microturbines 104A-N to spin in reaction to the directed airflow.

[00010] Further in this embodiment, the generator 106 converts the mechanical energy of the at least one of the plurality of microturbines 104A-N into electrical energy via electromagnetic induction. Furthermore, the output device 108 receives the electrical energy from the generator 106 and transfer to the external device 110. For example, the output device 108 includes devices, such as a superconducting magnetic energy storing device, a battery, an electrical capacitor and the like for storing the electrical energy. For

example, the external device 110 includes handheld electronic devices, portable electronic devices and the like.

[00011] The foregoing descriptions of specific embodiments of the present disclosure have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the present disclosure to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the present disclosure and its practical application, to thereby enable others skilled in the art to best utilize the present disclosure and various embodiments with various modifications as are suited to the particular use contemplated. It is understood that various omission and substitutions of equivalents are contemplated as circumstance may suggest or render expedient, but such are intended to cover the application or implementation without departing from the spirit or scope of the claims of the present disclosure.

CLAIMS

What is claimed is:

1. An airflow based microturbine power supply, comprising:

at least one microturbine configured to circulate upon receiving airflow and to convert to mechanical energy; and

a generator coupled to the at least one microturbine to convert the mechanical energy of the at least one microturbine into electrical energy via electromagnetic induction.

2. The power supply of claim 1, wherein the airflow based microturbine power supply is configured to attach to a surface selected from the group consisting of a person, an article of clothing, a weapon and a handheld device.

3. The power supply of claim 2, wherein the airflow is generated from movements of body of the person, the handheld devices, the weapons and/or the article of clothing.

4. The power supply of claim 3, further comprising:

an airtight chamber substantially surrounding the at least one microturbine, wherein the airflow generated by the movements of the body of the person, the handheld devices, the weapons and/or the article of clothing is captured in the airtight chamber and wherein the airtight chamber is further configured to direct the airflow towards the at least one microturbine to cause the at least one microturbine to spin in reaction to the directed airflow.

5. The power supply of claim 4, wherein the airtight chamber is an outfit worn by the person, a casing, and/or a cover for a device.

6. The power supply of claim 1, further comprising:

an output device coupled to the generator to receive the electrical energy and transfer to an external device.

7. The power supply of claim 6, wherein the output device comprises devices for storing the electrical energy, wherein the devices are selected from the group consisting of a superconducting magnetic energy storing device, a battery and/or an electrical capacitor.

8. The power supply of claim 1, wherein the at least one microturbine is rotatably coupled to the generator.

9. The power supply of claim 1, further comprising a control device to control the operation of the airflow based microturbine power supply.

10. The power of supply of claim 9, wherein the control device includes a microprocessor and embedded software.

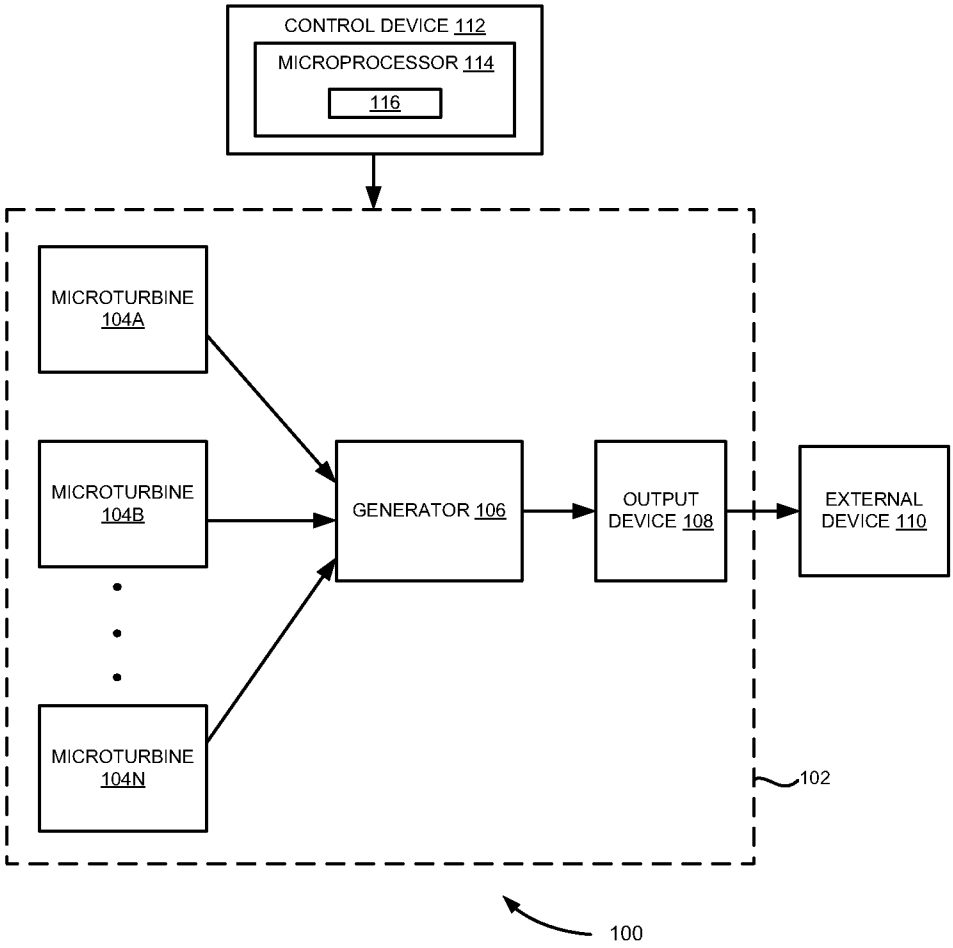

CONTROL DEVICE 112
MICROPROCESSOR 114
116
MICROTURBINE 104A
MICROTURBINE 104B
MICROTURBINE 104N
GENERATOR 106
OUTPUT DEVICE 108
EXTERNAL DEVICE 110
102
100

FIG. 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 12/42566

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - F02C 6/00 (2012.01)
USPC - 290/52
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)
IPC(8): F02C 6/00 (2012.01)
USPC: 290/52

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8): F02C 6/00 (2012.01)
USPC: 290/52; 60/783-785, 751

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST; PGPB, USPT, EPAB, JPAB; Google Scholar; Google Patent; Search Terms: MEMS micro-turbine nano-turbine micron mircoscale nano-scale wind air flow sheet anchor clothing jacket distribution bus grid power electricity energy storage battery capacitor controller CPU processor computer network web

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,392,313 B1 (Epstein et al.) 21 May 2002 (21.05.2002), Fig. 25-26; col 41, ln 25-66	1, 8
X	US 2008/0127510 A1 (Yang) 05 June 2008 (05.06.2008), entire document	1-8
Y	US 2008/0150298 A1 (Fein et al.) 26 June 2008 (26.06.2008) entire document	1-10
Y	US 2008/0150288 A1 (Fein et al.) 26 June 2008 (26.06.2008) para. [0051], [0097]	1-10
Y	US 2007/0097668 A1 (Choi) 03 May 2007 (03.05.2007) [0018], [0020], [0024], Fig. 1	4, 5
Y,P	US 2012/0093640 A1 (Chiang et al.) 19 April 2012 (19.04.2012) entire document	1-10
Y,P	US 7,977,807 B1 (Connor) 12 July 2011 (12.07.2011), entire document	1-10
A	US 2009/0230916 A1 (Fein et al.) 17 September 2009 (17.09.2009) para. [0094]	1-10
A	US 2010/0114387 A1 (Chassin) 06 May 2010 (06.05.2010) entire document	1-10
A	US 2008/0148549 A1 (Fein et al.) 26 June 2008 (26.06.2008) entire document	1-10
A	US 7,638,891 B1 (Fein et al.) 29 December 2009 (29.12.2009) entire document	1-10

☐ Further documents are listed in the continuation of Box C. ☐

* 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
16 August 2012 (16.08.2012)	07 SEP 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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