

**Hybrid Heater – Cooler/Chiller Integrator with Thermal Transformer (HHCCI-TT) System  
for Efficient Heating, Cooling, Refrigeration, and Air Conditioning**

BY MILIVOJE M. KOSTIC, SYCAMORE, IL, ON JANUARY 25, 2010

**Abstract**

This is to disclose an invention of a *Hybrid Heater-Cooler/Chiller Integrator* (HHCCI) system as an innovative method and device for efficient heating, cooling, refrigeration and air conditioning. This technical innovation is achieved using so-called *Thermal Transformer* (TT) based on *Thermodynamic* principles and efficiency optimization with regard to the *First Law of Energy Conservation* and the *Second Law of Energy Degradation*. It may substantially increase integral efficiency of Heating, Cooling, Refrigeration, and Air Conditioning, and set up a new paradigm in the industry. The method is suitable for scaling devices from mobile to residential to commercial applications. This invention has been inspired by Hybrid Water Heaters and Hybrid Prius car where existing power and storage technologies are integrated and optimized to substantially increase the over-all efficiency.

If interested in utilization and commercialization of the HHCCI-TT Invention,  
please email Inventor at [MK@MKostic.com](mailto:MK@MKostic.com). More contact information at [www.MKostic.com](http://www.MKostic.com)

...continue on NEXT page ...

**Hybrid Heater - Cooler Chiller Integrator with Thermal Transformer (HHCCI-TT) System for Efficient Heating, Cooling, Refrigeration, and Air Conditioning**

BY MILIVOJE M. KOSTIC, SYCAMORE, IL, ON JANUARY 25, 2010

**Abstract**

This is to disclose an invention of a *Hybrid Heater-Cooler/Chiller Integrator* (HHCCI) system as an innovative method and device for efficient heating, cooling, refrigeration and air conditioning. This technical innovation is achieved using so-called *Thermal Transformer* (TT) based on *Thermodynamic* principles and efficiency optimization with regard to the *First Law of Energy Conservation* and the *Second Law of Energy Degradation*. It may substantially increase integral efficiency of Heating, Cooling, Refrigeration, and Air Conditioning, and set up a new paradigm in the industry. The method is suitable for scaling devices from mobile to residential to commercial applications. This invention has been inspired by Hybrid Water Heaters and Hybrid Prius car where existing power and storage technologies are integrated and optimized to substantially increase the over-all efficiency.

**Background:**

The HHCCI-TT system employs innovative design and innovative application methods of efficient operation to provide simultaneously heating and cooling by integrating heat-pump and refrigeration cyclic machines, called here Thermal Transformer (TT) with Thermal Medium (TM, like water) storage systems and optimized Control System (CS) for improved energy efficiency and performance. Simultaneous heating and cooling are often required in buildings, industry and elsewhere; for example, to provide for space and water heating, refrigeration, air-conditioning, and heating and cooling for different other purposes in commerce, transportation and industry. The existing art is lacking in complete integration of heating and cooling as well as in achieving optimum thermodynamic efficiency and performance. The existing art of separate heating and cooling devices is also more expensive to fabricate and use than integrated system advised in this innovation. It is required in buildings, industry and elsewhere to provide energy for heating and cooling for different purposes, and different equipment is used, usually separate for heating and separate for cooling. If low-temperature heating is required, as is often the case for space heating and sanitary water for example and other process requirements, it is thermodynamically advantageous to use heat-pump cyclic devices (COP about 300%) but equipment being more expensive than classical simple heating equipment (COP efficiency below 100%). For cooling purposes, like in refrigeration and air conditioning and other process cooling requirements the use of refrigeration cyclic devices is necessary, and the latter could be used simultaneously for heating, thus working as heat pump and refrigeration machine simultaneously (called TT equipment here), thus eliminating cost for separate heating equipment while substantially increasing over-all energy efficiency and reducing use of energy resources and their environmental impact. With appropriate TM storage devices and optimized computerized process control to minimize working temperature-differences and other Thermodynamic irreversibilities, it is possible to eliminate prior art deficiencies and provide additional benefits



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

Table with 6 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY.DOCKET.NO, TOT CLAIMS, IND CLAIMS. Row 1: 61/297,958, 01/25/2010, , 110, ,

Milivoje Kostic
1320 Mary Wood Ct
Sycamore, IL 60178

CONFIRMATION NO. 3049
FILING RECEIPT



Date Mailed: 02/12/2010

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, 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 Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections 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

Applicant(s)

Milivoje Kostic, Sycamore, IL;

Power of Attorney: None

If Required, Foreign Filing License Granted: 02/04/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 61/297,958

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

\*\* SMALL ENTITY \*\*

Title

Hybrid Heater - Cooler Chiller Integrator with Thermal Transformer (HHCCI-TT) System for Efficient Heating, Cooling, Refrigeration, and Air Conditioning

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 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 (1-866-999-4158).

**LICENSE FOR FOREIGN FILING UNDER**  
**Title 35, United States Code, Section 184**  
**Title 37, Code of Federal Regulations, 5.11 & 5.15**

**GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and

Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).