Design and Fabrication of Atmospheric Water Generator

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Abstract- This study presents the design and fabrication process of a condenser for an Atmospheric Water Generator. The condenser plays a crucial role in collecting and converting atmospheric moisture into usable water. The design process involved considerations such as surface area, material selection, and heat transfer efficiency to optimize water condensation. Fabrication techniques, including 3D printing and precision machining, were employed to produce a functional condenser prototype. Performance testing demonstrated the effectiveness of the condenser in extracting water from ambient air under various environmental conditions. This research contributes to the development of sustainable water generation technologies, particularly in regions facing water scarcity.

Key Word: water vapor, filters, collects, purifies, produces drinking water.

I. INTRODUTION

designing and fabricating a condenser for an Atmospheric Water Generator involves creating a crucial component that facilitates the extraction of water vapor from the air and its conversion into usable water. The condenser plays a pivotal role in the efficiency and effectiveness of the AWG system, as it is responsible for cooling the air to condense water vapor, separating impurities, and ensuring the production of clean, potable water. This project focuses on developing an innovative condenser design to enhance the performance and reliability of AWG systems, contributing to sustainable water solutions in areas facing water scarcity.

II.LITERATURE REVIEW

In the literature review of the design and fabrication of a condenser for an Atmospheric Water Generator, various studies have explored different approaches to enhance water condensation efficiency and overall performance. Researchers have investigated factors such as condenser surface area, materials, and cooling methods to optimize water yield while minimizing energy consumption. Studies have highlighted the importance of selecting appropriate materials with high thermal conductivity and corrosion resistance to ensure long-term durability and efficiency. Additionally, innovative designs incorporating multi-stage condensation and advanced heat exchange mechanisms have been proposed to improve water production rates. Overall, the literature underscores the significance of condenser design in maximizing the effectiveness of AWG systems in providing clean and sustainable drinking water solutions, particularly in regions facing water scarcity challenges.

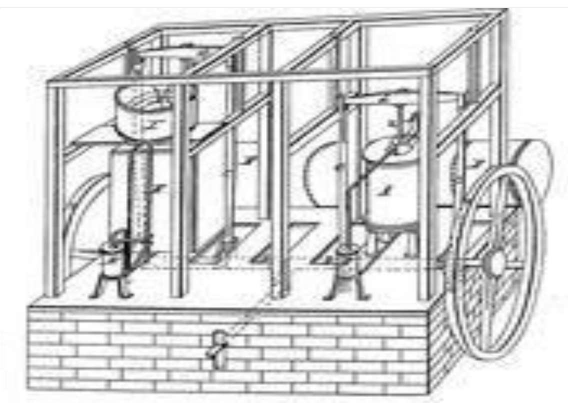
III. PROBLEM SOLVING

The design and fabrication of a condenser for an Atmospheric Water Generator (AWG) presents a crucial solution to water scarcity. This process involves meticulous problem-solving at every stage. Engineers must carefully select the condenser size and material to ensure optimal heat exchange, maximizing water vapor condensation. Additionally, they need to devise efficient airflow and cooling mechanisms to enhance condensation rates. Filtration systems must be incorporated to remove impurities from the collected water, ensuring its suitability for consumption. Prototypes are rigorously tested under various environmental conditions, and design refinements are made based on performance evaluations. The final condenser is fabricated using high-quality materials to guarantee long-term durability. Comprehensive testing is conducted to validate efficiency and effectiveness before documenting the design and fabrication process for future reference and improvement, ultimately contributing to sustainable water solutions.

IV. EXPERIMENTAL SETUP

In the experimental setup for the design and fabrication of a condenser for an Atmospheric Water

Generator (AWG), the focus is on creating an efficient system to extract water vapor from the air. The condenser, a critical component, is designed to cool the air to its dew point, causing water vapor to condense into liquid water. This condenser is fabricated using materials conducive to heat exchange and moisture capture, ensuring optimal performance. The experimental setup involves testing different condenser designs and configurations to maximize water yield while minimizing energy consumption. Various factors such as surface area, cooling efficiency, and airflow are analyzed to determine the most effective design. Through iterative testing and refinement, the goal is to create a condenser that enhances the overall efficiency and reliability of the AWG, ultimately contributing to sustainable water solutions.



3D Mechanical Water Generator

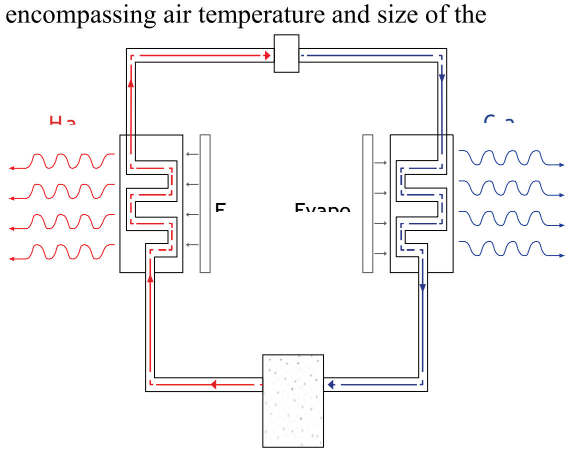
In conclusion, the experimental setup for the design and fabrication of a condenser for an AWG involves a systematic approach, combining thorough research, precision fabrication, and rigorous testing. The ultimate aim is to develop a highly efficient condenser that significantly enhances the water production capabilities of the AWG, offering a sustainable solution to water scarcity challenges.

V. METERIAL SELECTION

For the design and fabrication of the condenser for an Atmospheric Water Generator (AWG), selecting the appropriate materials is crucial for efficiency and durability. Stainless steel is often preferred for its corrosion resistance and hygiene properties, ensuring the purity of the collected water. Aluminum can be used for its lightweight nature and good thermal conductivity, aiding in heat transfer during the condensation process. Additionally, high-quality insulation materials such as foam or fiberglass can minimize heat loss and enhance energy efficiency. Silicone or rubber gaskets may be employed for sealing to prevent air leakage. Overall, the selection of materials should prioritize durability, thermal conductivity, corrosion resistance, and compatibility with potable water standards to ensure the effective functioning of the condenser in the AWG system

VI.WORKING PRINCIPLE

In a cooling atmospheric water generator, a compressor passes refrigerant through a condenser and after that an evaporator coil which cools the air including it. This cuts down the air temperature to its dew coordinate causing water toward consolidate. A controlled fan pushed separated air over the coil. The coming about water is then passed on to a holding tank with purging and filtration framework to help keep the water unadulterated and lessen the hazard postured by infection and microscopic organisms which might be gathered from the surrounding air on the evaporator loop by consolidating water. The rate at which water can be created relies upon relative moistness and encompassing air temperature and size of the

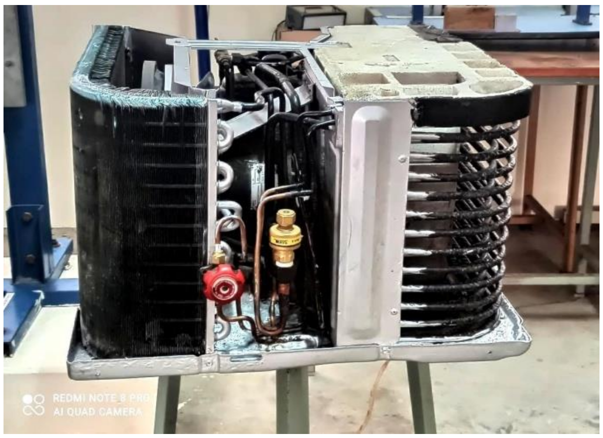


LINE DIAGRAMOF WATER GENERATOR

compressor. Atmospheric water generator turns out to be more viable as relative humidity and air temperature increase. As a control of thumb, cooling buildup water generator neglect to work productively when the temperature dips under - 15 C. This implies they are moderately wastefulwhen situated inside aerated and cooled offices. The cost viability of an

AWG relies upon the limit of the machine, local humidity and temperature conditions and cost to control the unit. Water is frequently dense from the air noticeable all around conditioners when the surrounding air is muggy and hot in seaside tropical regions. This water can be advantageously utilized for drinking reason.

VII. PHOTOGRAPHY



VIII. CONCLUSION

New weather patterns appeared in our world in the past century, and that caused lots of confusion for humans who used to expect only one weather pattern per season in certain areas. However, this is not the case in the current days, which means that people have to change their behaviors in so many ways if they want to have a good life quality for the future generations. However, it is obvious that finding sustainable alternatives of the traditional natural sources is one of the most important issues that should be studied and developed, whether for energy source, or water sources. Applying this system in a highly humid region almost 300 Milliliter of condensed water can be produced per hour during the day light, this is a promising result. Finally, in this report we talked about way of harvesting water from thin air, and these ideas mentioned above can solve the poorer arid areas water problems with cheap prices inventions that they can buy or maybe produce their selves. We can produce an unlimited supply of water without environmental pollution for the current water scarcity problem. Air water is a renewable source of water so the technology is a secured source for the future. However, we challenged ourselves to do the same but with the least amount of budget being spent on our system because we are aiming for the majority who do not have financial means to afford such big systems which can generate water from atmosphere. But, all things considered, we as a group did what was unachievable in the time frame of these three months.

And most importantly, we were able to defend our objective of this prototype which included the proper production of drinkable water where there is no access to clean drinking water and where the people are residing in extreme humid conditions. So, the system can successfully use the environmental conditions and parameters to be productive and useful. There have been many things we missed out on enabling our system to be very effective and efficient with the production of water. However, since it is still in a prototype stage, there are is lot of room for improvements. One of which is, to properly optimize the system which facilitate the production of water in case of conditions where humidity can be decreased too low.

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