INCREASE THE EFFICIENCY OF SOLAR WATER COLLECTORS

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Abstract. *This article is devoted to increasing the efficiency of solar-water collectors that heat water using solar energy. Light-absorbing elements of solar-water collectors have been proposed, constructive schemes have been developed. Based on the developed constructive scheme, the mode of operation of the solar-water collector is studied.*

Keywords: *solar-water collector, solar energy, light-returning element, solar radiation current, radiation surface, collector pipes.*

ПОВЫШЕНИЕ ЭФФЕКТИВНОСТИ СОЛНЕЧНЫХ ВОДОСБОРНИКОВ

Аннотация. *Данная статья посвящена повышению эффективности гелио-водяных коллекторов, нагревающих воду за счет солнечной энергии. Предложены светопоглощающие элементы гелиоколлекторов, разработаны конструктивные схемы. На основе разработанной конструктивной схемы изучен режим работы гелиоколлектора.*

Ключевые слова: *гелио-водяной коллектор, солнечная энергия, световозвращающий элемент, ток солнечного излучения, поверхность излучения, коллекторные трубы.*

INTRODUCTION

By the 21st century of technology, the conditions were created for the development of modern and most effective devices for using "renewable energy sources". This will primarily help prevent the release of harmful substances into ecology and thus save non-renewable energy sources.

MATERIALS AND METHODS

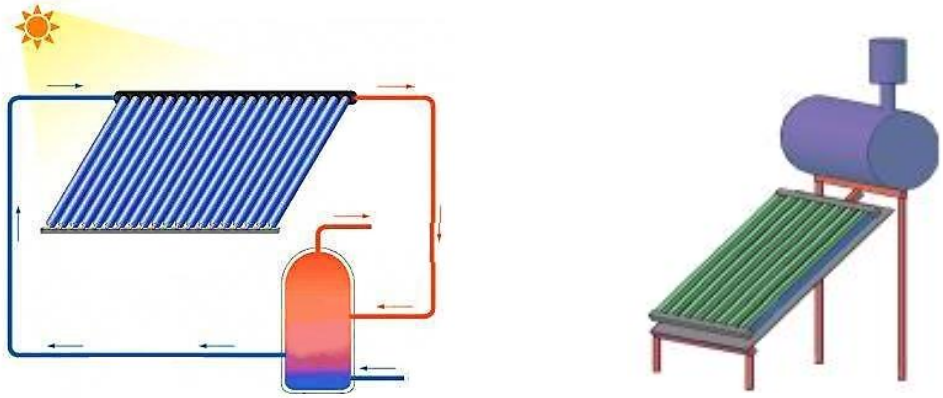
Currently, 80% of the energy consumed is obtained from activated coal, oil, gases from non-renewable energy sources, the so-called natural fuels. Now, practical work is underway to replace our need for this energy with renewable energy sources.

The transformation of solar energy into thermal energy occurs at the expense of the ability of the atoms of matter to absorb electromagnetic radiation. In this case, the energy of electromagnetic radiation is converted into the kinetic energy of the atoms and molecules of the substance, that is, into thermal energy. As a result, the temperature of the substance rises. Obtaining heat in such a method, due to its simplicity, provides an opportunity to achieve an adequate supply of energy to consumers of different levels. This path allows us to collect energy using environmentally friendly solar energy.

RESULTS

The principle of operation of solar thermal devices is based on the absorption of solar radiation by a black surface that receives solar radiation. This process can be quite complicated

depending on the type of light-absorbing material. Thanks to this, the energy of radiation at all wavelengths changes to heat. In this we will mainly consider the solar-water collector (Photo 1). We carry out this by placing additional equipment on the Collector part, which is the main part of the device to feed more energy. By providing full sunlight to the surfaces of the Collector pipes, we achieve a more complete absorption of energy. Water solar collectors were developed with light-returning elements even earlier. But in these structural elements, the beam-returning element is made several tens of times larger than the Collector pipe.



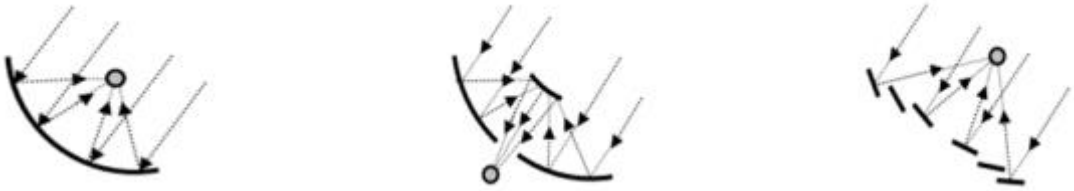
a) b)

Figure 1.

Scheme and appearance of the solar-water collector.

a) solar collector Scheme, b) general view of the solar-water collector.

An example of this includes collectors made with parabolas, flat, conical and several other structural elements(fig. In this case, the amount of energy that the Collector absorbs will be bound to the Collector's absorption coifitsiy, the return coifetsiy of the mirror, the radiation surface and radiation shell, the diameter of the Collector pipes, the average radiation of the mirror, and several other ber structural elements.



a) b) d)

Figure 2.

a) parabolic, b) parabolic with secondary reflector, d) Frenel concentrator

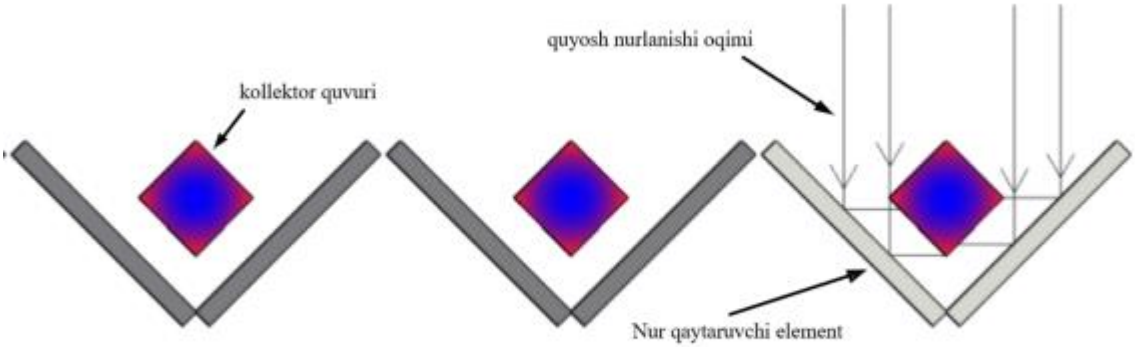


Figure 3.

Proposed collector structure.

DISCUSSION

The difference between this and the previous light-returning elements in aqueous solar collectors is that we take this light-returning element in one ratio with the Collector pipes and direct the pipe surface to the opposite side of the sun by direct orientation(fig.

CONCLUSION

This allows the aqueous solar collector to absorb heat through the full surfaces of its pipes. In this process, the light-returning element(mirror) allows the level of solar radiation to absorb solar radiation from the surface of the Collector pipe on the opposite side to the sun. As a result, by absorbing solar radiation through the full surface of the pipeline, we create the basis for increasing energy efficiency.

REFERENCES

1. Akramov, A. A. U., & Nomonov, M. B. U. (2022). Improving the Efficiency Account Hydraulic of Water Supply Sprinklers. Central Asian Journal of Theoretical and Applied Science, 3(6), 364-370.
2. Shavkatjon o‘g‘li, T. B. (2022). Proving The Inequalities Using a Definite Integral and Series. Texas Journal of Engineering and Technology, 13, 64-68.
3. Rashidov, Y. K., & Ramankulov, S. A. (2021). Improving the Efficiency of Flat Solar Collectors in Heat Supply Systems. CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES, 2(12), 152-159
4. Malikov, Z. M., & Madaliev, E. U. (2019). Mathematical simulation of the speeds of ideally newtonovsky, incompressible, viscous liquid on a curvilinearly smoothed pipe site. Scientific-technical journal, 22(3), 64-73.
5. Nosirov A.A., Nasirov I.A. Simulation of Spatial Own of Vibrations of Axisymmetric Structures EUROPEAN MULTIDISCIPLINARY JOURNAL OF MODERN SCIENCE https://emjms.academicjournal.io
6. Shavkatjon o’g’li, T. B. (2022). SOME INTEGRAL EQUATIONS FOR A MULTIVARIABLE FUNCTION. Web of Scientist: International Scientific Research Journal, 3(4), 160-163.
7. Усаров, Махаматали Корабоевич, and Гиёсиддин Илхомидинович Маматисаев. "КОЛЕБАНИЯ КОРОБЧАТОЙ КОНСТРУКЦИИ КРУПНОПАНЕЛЬНЫХ ЗДАНИЙ

ПРИ ДИНАМИЧЕСКИХ ВОЗДЕЙСТВИЯХ." Научный форум: технические и физико-математические науки. 2019.Рашидов, Ю. К., Орзиматов, Ж. Т., & Исмоилов, М. М. (2019). Воздушные солнечные коллекторы: перспективы применения в условиях Узбекистана. *ББК 20.1 я43 Э 40*.

8. Usmonova, N. A., & Khudaykulov, S. I. (2021, April). SPATIAL CAVERNS IN FLOWS WITH THEIR PERTURBATIONS IMPACT ON THE SAFETY OF THE KARKIDON RESERVOIR. In E-Conference Globe (pp. 126-130
9. .Hamdamalievich S. A., Nurmuhammad H. Analysis of Heat Transfer of Solar Water Collectors //Middle European Scientific Bulletin. – 2021. – Т. 18. – С. 60-65.
10. Xamdamaliyevich, S. A., & Rahmankulov, S. A. (2021, July). Investigation of heat transfer processes of solar water, air contact collector. In E-Conference Globe (pp. 161-165)
11. .Madaliev, M. E. U., Rakhmankulov, S. A., & Tursunaliev, M. M. U. (2021). Comparison of Finite-Difference Schemes for the Burgers Problem. Middle European Scientific Bulletin, 18, 76-83
12. Сатторов, А. Х., Акрамов, А. А. У., & Абдуразаков, А. М. (2020). Повышение эффективности калорифера, используемого в системе вентиляции. Достижения науки и образования, (5 (59)), 9-12.
13. Abdukarimov, B. A., O'tbosarov, S. R., & Tursunaliyev, M. M. (2014). Increasing Performance Efficiency by Investigating the Surface of the Solar Air Heater Collector. NM Safarov and A. Alinazarov. Use of environmentally friendly energy sources.
14. Madraximov, M. M., Nurmuxammad, X., & Abdulkhaev, Z. E. (2021, November). Hydraulic Calculation Of Jet Pump Performance Improvement. In International Conference On Multidisciplinary Research And Innovative Technologies (Vol. 2, pp. 20-24).
15. Abobakirovich, A. B., Sodikovich, A. Y., & Ogli, M. I. I. (2019). Optimization of operating parameters of flat solar air heaters. Вестник науки и образования, (19-2 (73)), 6-9.
16. Usmonova, N. A. (2021). Structural Characteristics of the Cavern at a Fine Bubbled Stage of Cavitation. Middle European Scientific Bulletin, 18, 95-101.
17. Nasirov Ismail Azizovich. On The Accuracy of the Finite Element Method on the Example of Problems about Natural Oscillations. EUROPEAN MULTIDISCIPLINARY JOURNAL OF MODERN SCIENCE https://emjms.academicjournal.io
18. Мадхадимов, М. М., Абдулхаев, З. Э., & Сатторов, А. Х. (2018). Регулирования работы центробежных насосов с изменением частота вращения. Актуальные научные исследования в современном мире, (12-1), 83-88
19. Madaliev, E. U., & qizi Abdukhalilova, S. B. (2022). Repair of Water Networks. CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES, 3(5), 389-394.
20. Abdullayev, B. X., & Rahmankulov, S. A. (2021). Modeling Aeration in High Pressure Hydraulic Circulation. CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES, 2(12), 127-136.
21. Abbasov, Y. S., & ugli Usmonov, M. A. (2022). Design of an Effective Heating System for Residential and Public Buildings. *CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES*, *3*(5), 341-346.
22. Умурзакова, М. А., Усмонов, М. А., & Рахимов, М. Н. (2021). АНАЛОГИЯ РЕЙНОЛЬДСА ПРИ ТЕЧЕНИЯХ В ДИФФУЗОРНО-КОНФУЗОРНЫХ КАНАЛАХ. *Экономика и социум*, (3-2), 479-486.

23. Mo‘minov, O. A. O‘tbosarov Sh. R.“Theoretical analysis of the ventilation emitters used in low-temperature heat supply systems, and heat production of these emitters” Eurasian journal of academic research, 495-497.
24. Hamdamalievich S. A. Determination of the deposition of particles contained in the water passing through the sump well //Central asian journal of theoretical & applied sciences. – 2022. – Т. 3. – №. 6. – С. 244-251.
25. Рашидов, Ю. К., Орзиматов, Ж. Т., Эсонов, О. О. Ў., & Зайнабидинова, М. И. К. (2022). СОЛНЕЧНЫЙ ВОЗДУХОНАГРЕВАТЕЛЬ С ВОЗДУХОПРОНИЦАЕМЫМ МАТРИЧНЫМ АБСОРБЕРОМ. Scientific progress, 3(4), 1237-1244.
26. Madaliev, M. E. U., Maksudov, R. I., Mullaev, I. I., Abdullaev, B. K., & Haidarov, A. R. (2021). Investigation of the Influence of the Computational Grid for Turbulent Flow. Middle European Scientific Bulletin, 18, 111-118.
27. Maqsudov, R. I., & qizi Abdukhalilova, S. B. (2021).Improving Support for the Process of the Thermal Convection Process by Installing. Middle European Scientific Bulletin, 18, 56-59.
28. ugli Mo‘minov, O. A., Maqsudov, R. I., & qizi Abdukhalilova, S. B. (2021). Analysis of Convective Finns to Increase the Efficiency of Radiators used in Heating Systems. Middle European Scientific Bulletin, 18, 84-89.
29. Усаров, М. К., and Г. И. Маматисаев. "Вынужденные колебания коробчатой конструкции панельных зданий при динамических воздействиях." Проблемы механики 2 (2010): 23-25.
30. Nosirov A.A., Nasirov I.A. Simulation of Spatial Own of Vibrations of Axisymmetric Structures EUROPEAN MULTIDISCIPLINARY JOURNAL OF MODERN SCIENCE https://emjms.academicjournal.io