machines. The stage of delivery also determines expenses on sale of machinery. Therefore the important value has optimization of calculation of necessity of agricultural machines for their realization by auction enterprises.

Agricultural machines, technical service, delivery, calculation of necessity, auction enterprises.

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HEATING SYSTEM Greenhouses USING VACUUM heliocollector

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The results of development Greenhouse heating systems using vacuum heliosystems and results doslidzhennnya energy efficiency using heat-protective screens in the combined water and solar heating. Determined replacement rate of heat stress.

Greenhouses, heliocollector vacuum, heating, thermal resistance, energy efficiency, the replacement heat load.

Problem. To grow vegetables and sprouts in winter and early-spring periods used cultivation greenhouse facilities, including Hangar and block greenhouses, ranging from 1 to 60 ha. Ensuring appropriate microclimate powerful vegetable plants require significant

of the heat energy. To 1 kg grown in greenhouses agricultural products consumed at 1015kg fuel [2]. To obtain high yields of vegetables should maintain a temperature of 18...26 ° C at a depth of 0.2...0.3 m, ie in the area of the roots.

Analysis ostannыh research. Formation in the volume of greenhouse and soil layer temperature, humidity and gas fields depends on constructive solutions engineering systems microclimate. At the same time ensure proper temperature in the soil can receive 25-30% more compared to early vegetables harvest gathered in a greenhouse without heating subsoil. Greenhouses are among the largest consumers of thermal energy, so it is advisable to concentrate on building their enerhoefektyv heating systems, which do not require large initial costs (FER) and yet can provide the optimal microclimate during the cold season.

With the rapid growth of prices for fuel and energy shortage of traditional energy sources urgency of finding ways of improving heat supply systems using renewable energy sources - solar, wind, geothermal heat obvious. In particular, it is advisable to use solar energy to heat water using solar collectors for process and needs, as well as to heat the coolant circulating in the system water heating and direct heating environment in buildings protected ground for growing crops.

The purpose of research - Develop a system of heating greenhouses using traditional water heating and renewable -solar vacuum collectors and investigate its efficiency.

Results. Achieving this goal is possible through the use of solar energy with the rational use of heat in the comp "Books adjusting its costs, resulting in an optimal microclimate and as a result, makes it possible to increase the yield of greenhouse crops and their quality.

Methods and materials research. **Radiation regime in Ukraine [1, 2] favorable for practical use of solar energy.** Fromdignity recent meteorological observations in the Ukraine during the year is depending on the region of 100 ... 200 sunny days. As a result of statistical meteorological data for the decade incoming solar radiation defined specific energy data from the incoming solar energy and the distribution of the energy potential of solar radiation for each territorial zone of Ukraine.

Average annual total solar radiation entering the 1 m2 surface in Ukraine within: 1,000 kWh / m2 in northern Ukraine to 1400 kWh / m2 in the Crimea. The average annual potential of solar energy in Ukraine 1235 kWh / m2, is much higher than, for example, in Germany (1000 kWh / m2) and Poland (1080 kWh / m2). So we have good opportunities for effective use of solar energy in Ukraine.

Based on the comparison of technical and energy characteristics of different types of solar collectors was found that the most promising for use in heating greenhouses and other agricultural facilities and hot water is vacuum solar collector with direct heat transfer and integrated water heat exchanger. **These** collectors are used in the development of this system heating greenhouses, as shown in Fig.

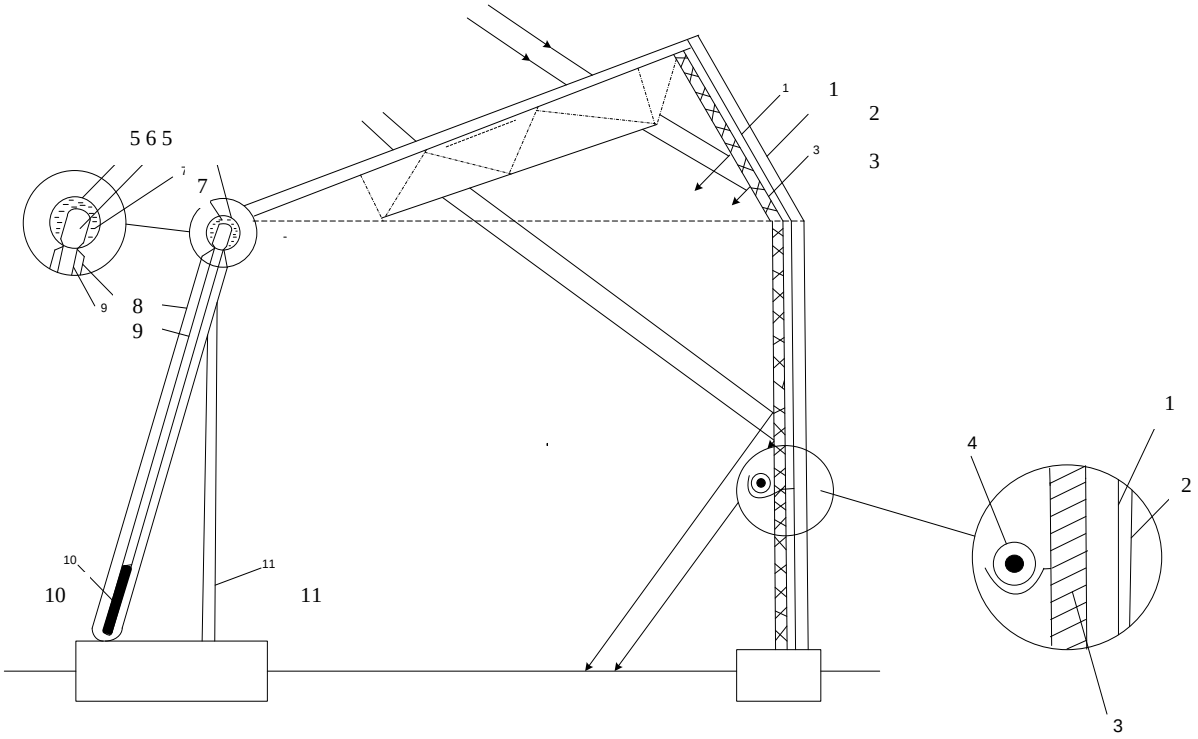

Fig. Helioteplytsya 1 - design element; 2 - sontsepronyknyy slope; 3 - a heat screen; 4 - tent heating pipe; 5 - Distribution collector water heating;
6 - the upper part of the inner tube vacuum heliocollector; 7 - coolant; 8 - transparent outer tube; 9 - inner tube; 10 - organic liquid, 11 - support.

The feature developed district heating system is that for more efficient use of solar energy on the south side of the vertical walling greenhouses to the level of under-roof solar farm set with vacuum solar collector at an angle relative to the horizon, depending on latitude areas where solar is installed. The outer tube solar collector, made of hardened glass barosylikatnoho are transparent, so sunlight through a glass tube heated indoor solar collector and the internal environment in the greenhouse. Inner tubes are made of a material having high thermal conductivity and high-quality multi-coated selective coating that provides up to 97% absorption of radiative energy from the sun at a minimum reflektsiyi (reflection) 3 ... 7%. They filled partially non-toxic organic liquid with a boiling point below -30 ° C. Between the outer and inner tubes vacuum, so that heat transfer by convection and conduction visutniy and, consequently, the loss of heat regardless of the ambient temperature insignificant.

Top of the internal vacuum tubes heliocollector placed directly in the switch collector water heating system and serve as a capacitor. So DH used double (bivalent) scheme: traditional water heating system, which is powered by a boiler (gas or electric boiler) and solar heating

vacuum heliocollector working as thermosyphon with little or no increase in pressure in the line.

When installing solar systems with vacuum solar collectors, provides intense absorption of solar radiation inner tube with high quality selective coating, heat and evaporate the organic liquid with increasing temperature. The top of the pipe (tip - capacitors) located within the distribution system of water heating collector, the heat transferred to the water circulating in the system water heating greenhouses, not only due to cooling steam and heat and condensation of organic liquids while increasing the heat transfer coefficient, caused process steam condensation of organic liquid which then flows down to the area of heating. The vacuum manifold is equipped with 10-30 vacuum tubes that are parallel to each other. Number of collectors depends on the needs and determined by the cost of water by a vacuum tube that heats 10 liters water.

Solar works on cloudy days absorbing infrared radiation which passes through the clouds, and at lower ambient temperatures down to minus 30 ° C. Helioplant works with about 60% efficiency, which is 9 months in the southern regions of Ukraine (March to November), and 7 months - in the northern areas (April to October). In winter, the efficiency of the solar system falls but does not disappear, can really heat the water up to + 30 ° C - + 40 ° C, so year-round operation at peak set dohrivach (electric or gas boiler) for dohrivannya water to 60 ° C.

To reduce heat losses through the building envelope installed shielding screens [3]. Due to the growth of the thermal resistance of 0.25 (m2 K) / W to 2.20 (m2 K) / W, and reflection of thermal radiation from the sun soil, tents and on the inner surface of the heat shielding screens loss **heat** reduced by 136-195 W / m2.

Conclusion. A system of heating greenhouses using traditional water heating and renewable - solar vacuum collectors.Studied the energy efficiency of the heating system Greenhouses - Defined replacement rate of heat load (the share of solar energy in the coating thermal load) which at absorption vacuum collectors 97% emissivity and solar reflektsiyi level 3 ... 7% is 0.58.

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Results Yzlozhenы development system teplosnabzhenyya Using greenhouses with vakuumnыh helyokollektorov and Results of research with s enerhoэffektyvnosty Using teplozaschytnыh ekranov kombynyrovannom with a water and SUNNY obohreve. Opredelen Factor zameschenyya thermal load.

***Greenhouses, Vacuum Geliokollektor, teplosnabzhenye, termycheskoe Resistance, energy efficiency, thermal load Factor zameschennya*.**

Results of development of эsystem of hotbrining of hothouses with using of vacuum geliocollector and results of investigation of its energy efficiency with using of heatcover screens for combined aquatic and sunny heating are considerated. Economic effect of applying results in industry is certain. It ia coefficient of substitution warm loading.

Hothouse, vacuum geliocollector, hotbrining, thermal resistance, energy efficiency, coefficient of substitution warm loading.

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Stereometric PRINCIPLES OF DETERMINATION OF DESTRUCTION pavement COATED AVTOTRANSPORTNE ROAD

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By analogy with the method of determining defects stereometric analysis method developed parts macrostructures determination of the destruction of the pavement surface. As the destruction of pavement performance properties such defects are considered: volume potholes, chipping and shells. Provided formula volume defects. This allows you to determine the materials needed to restore the pavement.

Stereometric analysis, defects, fracture, chipped, chipping, sinks volume defects.

Problem. The importance of transport links to society unconditional and shall not be questioned. This is due not only to Prompt deliveries of goods, passengers, implementation services in the field of health care,