Acta Scientific NUTRITIONAL HEALTH (ISSN:2582-1423)

Volume 7 Issue 5 May 2023

Short Communication

Ice Storage in a Multistory Building

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Received: February 06, 2023

Published: April 05, 2023

Continued from the article: Energy Consumption Increases the Comfort of Mankind, but Destroys the Climate- https://actascientific.com/ASMI/pdf/ASMI-05-1138.pdf

Using the ambient temperature during the cold season and making ice in the winter reduces energy consumption. It can lead to a complete rejection of refrigeration equipment when storing food.

The production of refrigeration and cooling equipment for domestic comfort, based on artificial cold, has become a powerful industry - an independent, independent and parasitic industry.

This direction of human life activity is unnatural because it is directed against nature - it does not produce anything, but only consumes. In nature, there are no technologies and production of artificial cold. The storage of food for a long time was known even before the advent of modern technology, for example, cured and smoked meat in the intestines. Other products in cellars with ice. Before, when there were no refrigerators, food was stored in basements. Some of them were equipped with ice storages. They chipped off ice in the rivers and laid it down to keep the temperature low. This ice was stored almost all summer and cooled the food.

One of the main consumers of electricity is the refrigerator. https://actascientific.com/ASMI/pdf/ASMI-05-1077. pdf: Powering the household refrigerators alone in a city of two million requires 1 billion kWh of electricity – the generation of an entire power plant.

Modern technologies for air cooling and ice production, based on the distillation of refrigerants, have many types and purposes. Each such device is a complex heat exchange structure made of expensive and scarce materials that requires continuous power consumption. We cool food, drinks, we can get ice all year round and every day for any whims - from cooling cocktails to ice stadiums and ski slopes.

Nature did not expect such volumes and neglect of its capabilities. How can you artificially create cold when everything in the environment freezes, even rivers. In the middle and upper continental latitudes.

At temperatures outside the house from +2 to -300C, we use energy to heat the room with heating devices to a comfortable +200C, and then, with motor-compressors, we drive freon around the clock to cool in the refrigerator chambers, what is heated to the required 2 - 40C is real stupidity.

The labor intensity of construction, the maintenance of ice storage in the basements of houses, special rooms, the harvesting and storage of ice led to the almost complete death of this technology.

It is possible to modernize this principle. Bring the ice storage closer to each apartment of a multi-storey building, get ice from natural frost and create conditions for comfortable use.

The search for methods and technologies for obtaining ice by natural cold and its subsequent storage led to the following information

- https://www.xiron.ru/content/view/29258/28/: As the size increases, the icicles freeze together, forming an ice mass. In 3-4 days, 60% of the total volume of the cooling tower is filled with ice. Then the icicles are chipped, which is a rather laborious process. In the cooling towers designed by I. A. Kleymenov, icicles are frozen on tubular electric heaters, which are put into operation

when a certain amount of ice is frozen, and the icicles are chipped off automatically.

It turns out that the production of ice is done in some industries. So there is a way to get ice without freon at minimal cost and by nature itself.

Bringing this principle closer to a convenient form for consumers on a massive scale - in apartments of high-rise buildings is not such a difficult task.

Modern materials and capabilities can provide the production, storage and use of natural ice to preserve the food of each family without consuming electricity. To do this, use the system for cooling products in winter with outside air - https://actascientific.com/ASMI/pdf/ASMI-05-1138.pdf - by running outside air through the cold store. In winter and cold time - in spring and autumn at night the temperature drops below zero. The use of natural cold can be extended further - into the summer. If the ice storage is not in the basement, but at hand, more precisely, at a distance - within easy reach - behind the outer wall, where it is frosty in winter. Create an ice storage behind the outer wall of the house on each floor. To freeze ice in winter and use its temperature in summer.

In the construction of new houses, the architecture of the concept with cooling devices on all floors can be adopted. To do this, a single shaft is installed outside the house or inside the walls of a new construction house with access for each apartment, such as an elevator shaft, divided by floors and apartments. This is a container with walls sealed for heat transfer. Such walls keep cold in conventional refrigerators. Only here in these walls special windows are created, which They open and close for warmth, like the doors of a conventional refrigerator. When opened, the cold through the thin walls transfers the outdoor cold to the water and turns it into ice. At positive temperatures, the doors of all floors hermetically close the windows with a special actuator.

In winter, the water freezes and turns into ice. In spring and summer, this ice becomes the main cooler of the refrigerator. The control system monitors the process and changes the heat transfer at each temperature transition through zero degrees.

In spring and autumn, an insignificant part of the thawed ice during the day turns back into ice at night. With the onset of summer and constant positive temperatures, the ice gives off cold and gradually melts. Maybe until the fall. Inside the shaft there is a chamber with shelves for products with sealed walls and a door.

Structurally, all these processes can be solved, for example, a compensator against the pressure of expanding ice should be provided in each compartment. Schemes for the conservation and replenishment of water and heat flows have been thought out and developed. Temperature sensors and controlled actuators provide freezing and ice utilization as weather conditions and occupant needs change.

Figure 1

Figure 1 shows a diagram of a natural refrigerator on the floors of a high-rise building. Vertically, the house is pierced by a single shaft with a diameter of 1, maybe 2 meters. The diameter or sectional area, the shaft can have any sectional shape, is determined empirically. The entire capacity of the mine is divided into floors. The surface of the entire shaft is thermally insulated, like the walls of an existing refrigerator. Except for some part that has adjustable thermal insulation - not shown. This window is a part of the wall along the entire vertical shaft, which can be closed and opened by a door with thermal insulation, such as a refrigerator door, only to let in cold. It is controlled by a single actuator automatically, depending on the outdoor temperature. The cooling chamber is exactly the same cavity with shelves and holders as in a conventional refrigerator.

When spring comes, the thermal window closes at positive temperatures and opens at night - at negative temperatures. The melted part of the ice freezes again. The ice continues to cool the food that residents use through the doors of the cooling chamber. Its volume depends on the number and needs of the tenants of the apartment, modes of use. In autumn, when the temperature begins to fluctuate around 0 degrees Celsius, the windows are switched back to open-closed mode.

Natural cold and frost is becoming the main means of preserving products with simple devices and uncomplicated automation. The main goal is achieved - to get rid of the motor-compressor and the principle of cooling by freon distillation.

Creating a project for such a house and construction will take several years. However, this is too long. The process of testing and verifying the principle can begin right now. The simplest ice storage can be arranged on a balcony or instead of part of a window.

You can use a broken refrigerator. The motor-compressor, evaporators and radiators are removed from it. The refrigerator is laid on its back so that the door opens up - it turns out a chest. The entire cavity of the chamber is sealed - it is possible with polyethylene. In autumn, a quarter or half is filled with water and left open. Water turns to ice. The food is placed on the ice or grate and the door is closed. Products change as needed. The door opens and closes manually, but it is also possible to install a thermostat valve that supplies cold air at a negative temperature.

Another option is a container on the balcony. A volume of, say, 200 liters is an ordinary barrel. In winter, the water in it turns into ice. In the summer it is well insulated and becomes a cooling chamber. In spring and autumn, sub-zero temperatures alternate with positive day and night, and the thawed part of the water during the day turns into ice again at night.

The volume, quantity of products, thermal insulation, devices for compensating against the expansion of ice, the time of use in the summer - everything is selected individually. But it is possible to manufacture and launch a series of devices according to standard sizes.

The exclusion of refrigeration equipment with freon on a city and country scale can eliminate this industry. The same direction can be extended to industrial and commercial refrigerators.

On the scale of cities and countries, the construction of new power plants and the elimination of obsolete ones are stopped. The release of water from reservoirs will return to nature natural evaporation, on which the climate depends.