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Development of Heating System

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Heating is an artificial heating of premises in order to compensate for thermal losses and maintain the temperature at a given level that meets the conditions of thermal comfort and/or the requirements of a scientific and technical process.

Heat supply systems have long been developing centrally, that is, on the basis of the construction of thermal power plants, district, quarter, village boiler houses. District heating, in turn, requires laying an extensive network located underground or on the surface of thermal pipes to ensure reliable thermal insulation, protection against corrosion and mechanical damage during long-term operation. This all very quickly increases the cost of construction, complicates operation and repair. District heating is especially inapplicable for heating private houses in the countryside, since the consumer of thermal energy is located at a significant distance from first-hand sources. For this reason, local heating systems are considered more rational systems for heating private residential buildings [1]. That is why heating is called artificial heating of rooms in a building with compensation for heat losses in order to maintain the temperature at a given level, which is determined by the conditions of thermal comfort of people and the requirements of the ongoing technological process. A heater is provided for this purpose [2].

The development of heating is inextricably linked with the history of the earth's population. The very first heating appliances, which were ordinary bonfires built specifically in a

dwelling, were famous back in the Stone Age. Later, the ancient Romans made a great contribution to the development of heating. In the first century BC, a heating system, the hypocaust, was developed. For its arrangement, a two-level floor was required, which was deep in the ground, hollow bricks for the removal of flue gases and slabs of baked clay, because of these slabs it was possible to achieve significant heat transfer of the system. Fuel was burned in the underground space, heating the stokes.

In the 15th–17th century, brick ovens began to be used in Russia. Furnaces, similar to primitive fireplaces, built without glue, were used to heat houses and make food. In the 15th century, the design of the furnace underwent significant changes. In houses, on a hill they began to install adobe chicken coops, which were a thick-walled vault. At the beginning of the 17th century, wood chimneys appeared, which increased the productivity of stove structures, but also increased the risk of starting a fire. In the 18th century, a white Russian stove appeared, which firmly established itself in Russian homes – it was made of brick, coated with clay on top.

The transition to radiators from the Russian stove occurred in 1855. The first radiator was a metal one that used warm water to heat the rooms. The creator of the metal radiator was Franz San-Gali, a businessman with German roots. The radiator, invented by an excellent German, strongly suggested modern cast-iron batteries, but was of enormous size [3].

At the very end of the 19th century, water systems with a gravity system became popular all over the world. But their shortcomings were obvious: high price and uneven distribution of heat. It was then that the engineers began to look for new solutions and made a system for which a pump was used. The most famous was water heating with a pump drive [4].

It was only in 1920 that the construction of central heating began. Then new thermal power plants were built,

where electricity and the method of heat cogeneration were used. By the beginning of the World War II, cast-iron radiators appeared, including in government institutions, and in almost all residential buildings. In 1930, the Swiss Robert Zender made a metal tubular radiator. This device was much better and lighter than cast iron, possessed the highest heat transfer, did not achieve great production costs. The design of iron radiators was even more beautiful than cast iron ones.

In 1961, the first attempts were made to make aluminum radiators. Nowadays they are popular in central heating systems. The most popular manufacturer of aluminum radiators is Faral. Today, aluminum radiators are produced in 2 versions: these are cast devices with a continuous section and radiators, in which place any section consists of 3 interconnected parts [4]. It is hard to say in which direction heaters will develop, but history shows that human imagination is limitless. Radiators today serve as a source of heating, and also perform the function of a full-fledged decorative element.

Russian scientists have developed an innovative plan infrared heating system. It consists of a thin polymer film and a durable carbon fiber heating element. PLEN emits the thermal component of sunlight, which is absorbed by the floor, ceiling, furniture and creates a comfortable temperature in the room.

If your country house is located next to a non-freezing reservoir, then the necessary thermal energy can be obtained from the water. To achieve the desired result, a heat exchanger probe is placed at the bottom of the tank, and a thermal pump is installed in the housing. The larger the probe, the more efficient the hydrothermal plant.

In warm climates, an air-to-air system is used. The most common types of such thermal pumps are inverter air conditioners. They are equipped, as well as conventional air conditioners. The efficiency of their work decreases at sub-zero temperatures.

Electronic space heating can be attributed more quickly to conventional heating methods that have been modernized in recent decades. Electrical appliances are primitive, comfortable and reliable. Electronic heating has long been used for local heating.

After researching the innovations of the heating system, it turned out that at each historical step it underwent great changes. For old people, heating was the only way to survive. The engineers of the Empire of Rome made a special contribution to the history of heating. It was here that the main heating and floor heating systems were born. The Russian stove also had a huge impact. The whole life of the Slavic people was closely connected with it. The Russian stove contributed to the origin and development of many folk crafts. It is impossible not to list modern heating systems, including steam and water, but also radiant, which brought high-quality and, most importantly, non-hazardous heat to our homes. The heating system has not left us for a single moment throughout history, and will not leave us in the future.

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