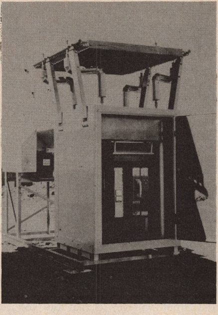
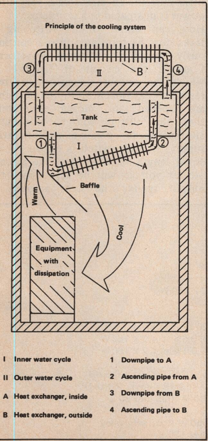
SELEKTOR

sing heat to cool the Sahara

small communications station in the rth African desert is constantly ated up by the dissipation of its radio lay amplifiers. And yet even in the treme midday heat the temperature side the insulated shelter is about ten grees below that outside. The cooling fect is produced without pumps and ns, entirely without the use of energy, means of an ingenious 'rectifier' stem of air and water cycles devised the Siemens development laboratories. orking roughly on the principle of avity-circulation hot-water heating, e system extracts heat from the terior during the day, stores it in a ater tank and discharges it to the vironment during the night. In this ay the system acts as a 'refrigerator' ring the day.

he cooling system was developed in an fort to protect communications uipment in extreme climates from cessively high temperatures, without lditional energy having to be supplied r this purpose. The shelter (1.3 m^3 lume), equipped with heating ements (150 W), fulfilled all expec- tions the very first time it was tested the climatic chamber. The equally od results obtained in the test under treme outdoor conditions encouraged emens to extend the tests to larger elters with a volume of about 20 m^3. he unpowered cooling system is based the differences in density and weight of liquids caused by different temperatures. It consists of three cycles. The warm air rising from the equipment in the shelter is first guided by a baffle to heat exchanger A where it cools and consequently flows downwards again to the equipment. The second cycle is formed by the water in exchanger A. It heats up, expands and, as a result of its lower specific weight, passes through an ascending pipe to a central tank inside the shelter, while a downpipe with cooler water feeds exchanger A.





Heat exchanger B, which links the tank with the exterior, is warmer during the day, so that no cycle is created. At night, however, as soon as the outside temperature drops below the temperature of the tank, the third and most important cycle is started up: the water from exchanger B cools the contents of the tank — via an ascending pipe and a downpipe again — until the densities have become equal or until the ambient temperature rises above that of the tank again. The reservoir cooled in this way is then used for fully automatic cooling of the interior during the day.

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(395 S)

'Charged' cars are no danger

You occasionally see them: cars dragging a 'tail' of metal braiding and hard rubber behind them, intended to discharge the static charge of the vehicle. The idea comes from the big tanker trucks, which always drag along a metal chain touching the ground. But does this 'discharge band' really serve any useful purpose? Engineers at the Siemens high-voltage laboratory in Berlin investigated to what extent cars are charged while being driven. Friction between the wheels and the road surface is the main cause for the electrical charge. The rubber-tired vehicle is electrically insulated as it rolls on the roadway; it is — from a physical point of view — a capacitor with a capacitance of about 100 pF. When the weather is dry and the insulation resistance of the tires is thus sufficiently high the 'autocapacitor' will be charged to approximately 10,000 V. The energy stored equals about 0.005 Ws. This amount of energy is so small that it can be discharged via the human body without causing any harm whatsoever. If a 'charged' car is touched with the hand, the energy will almost completely discharge in about a microsesond. In a darkened room this discharge could be perceived as very thin blue sparks, but in daylight or with street lighting it remains invisible. The whole effect is thus similar to the static charge experienced when one walks on synthetic carpets: it is a nuisance, but completely harmless.

The electrical voltage between the car body and the road surface can always be measured in terms of tens of thousands of volts even at high speeds since pointed or sharp-edged parts of the car body provide for local discharging and prevent higher voltages from being attained.

It is questionable whether conductive bands can prevent cars from becoming charged. The vehicle can only be charged when both the road and tires are dry — in the rain a good electrical discharge is always available. A dry road surface acts as a high electrical resistance, making it difficult to bring the charge from the car to the ground. For the owner of a passenger car there is really only one piece of advice: since it is impossible to protect oneself against spark discharges resulting from static charging it is better to accept them without a fuss. If one is prepared for the tingling sensation it is easier to take. People are not endangered by the charge on a car — regardless of whether or not one attaches a 'lightning conductor' to the car or not.

Siemens engineers once again advise motorists caught in a thunderstorm to drive to the nearest parking space and remain in the car. Since the vehicle is a closed Faraday cage passengers are best protected against lightning inside the car.

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