

MAGNETRONS, MELTED CHOCOLATE, AND MICROWAVE OVENS



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Percy Spencer, inventor of microwave ovens, displays a magnetron tube. The magnetron produces microwaves, which are absorbed by water and fat molecules.

What do radar, chocolate, and popcorn have in common? They were all crucial to the discovery of microwave cooking. A scientist named Percy Spencer came up with the idea of microwave ovens while studying radar. And it all began with a melted chocolate bar.

The First Microwave Popcorn

In the late 1940s, Spencer was touring a laboratory. He'd tucked a chocolate bar in his pocket, just in case he needed a snack. When he looked in his pocket, he noticed that the chocolate bar had melted. The lab he was touring was conducting research with magnetrons. Magnetrons are instruments that produce power in the form of microwaves.

The melted chocolate bar led Spencer to conduct some experiments. He decided to see

whether microwaves from magnetrons could be used to cook food. He placed some popcorn kernels near a magnetron and saw them pop open. He even tried cooking an egg. That experiment was not so successful. The egg exploded! From these simple experiments, Percy determined that microwaves could be used to heat food.

Evolution of the Microwave Oven

In an effort to apply this new knowledge, Spencer developed the first microwave oven. It weighed more than 1600 kilograms and was more than 1.7 meters high. Because of the size and cost, it wasn't a big seller. However, it was used in restaurants and other places where large amounts of food had to be cooked quickly.

(continued)



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Restaurants were among the first commercial users of microwave ovens. As you can see, they were quite large.

The first countertop microwave ovens became available in the late 1960s. These models had only two buttons: “Start” and “Light.” For timing, they had two control knobs: one for up to five minutes and one for longer cooking times.

In 1975, the first programmable microwave

ovens hit the market. These ovens had computer chips that allowed users to program cooking times. Today’s microwave ovens allow users to control the time and the power level. They also have preprogrammed settings for common uses—such as making popcorn.



COURTESY OF AMANA APPLIANCES

In the 1960s, microwave ovens became smaller and people began using them in their homes. They were small enough to be placed on kitchen counters.

What's Inside?

As Spencer discovered, the microwaves produced by a magnetron can heat food. But there are many other important parts to a microwave. A microwave oven can be looked at in two sections: the control section and the high-voltage section.

The control section contains a timer, a power control, and safety features. The safety features are switches and fuses that keep the oven from working when there are problems. For instance, if the oven door is open, a switch keeps the circuit open so the oven won't work. The power control regulates the power output

within the oven. The timer tracks how long the microwaves are on.

The high-voltage section of the oven contains the magnetron. This section also houses a circuit with a transformer, a diode, and a capacitor that increase the incoming voltage of the oven so the magnetron can work. Normal household voltage is 115 volts. The special circuit in the microwave raises the voltage to about 3000 volts. These waves are sent down a metal channel to the cooking area. There, they can interact with the molecules in the food and melt the chocolate or pop the popcorn, as Spencer discovered. □

