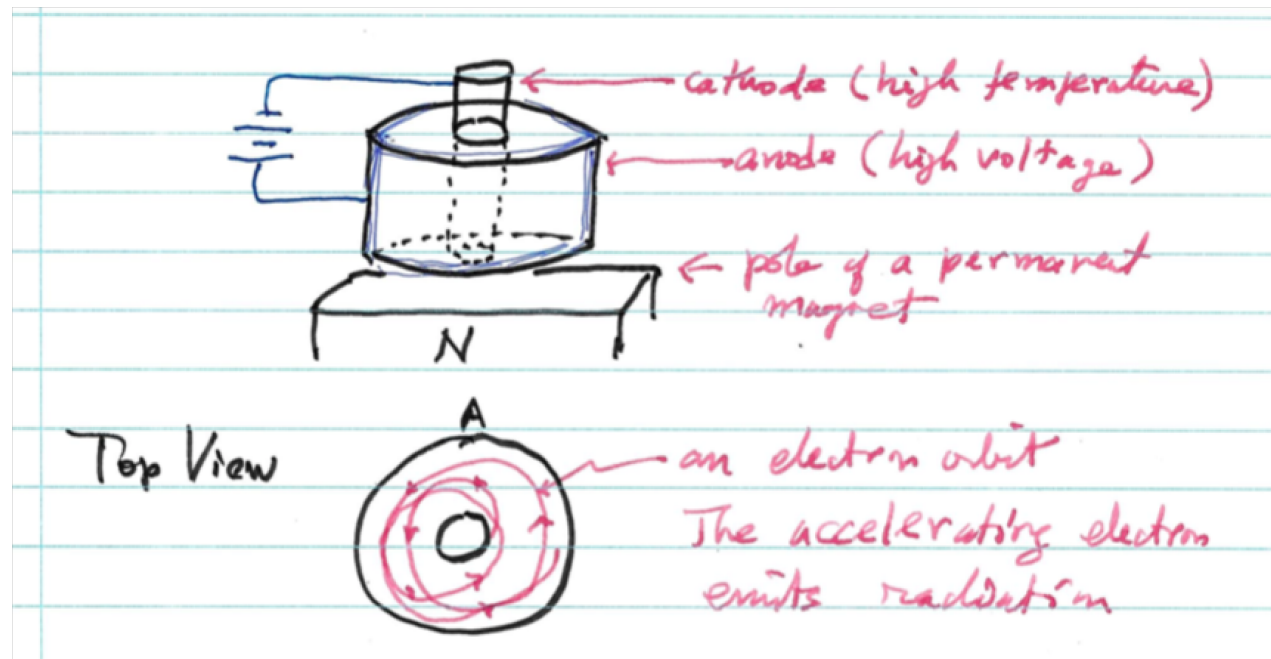


# The Cavity Magnetron

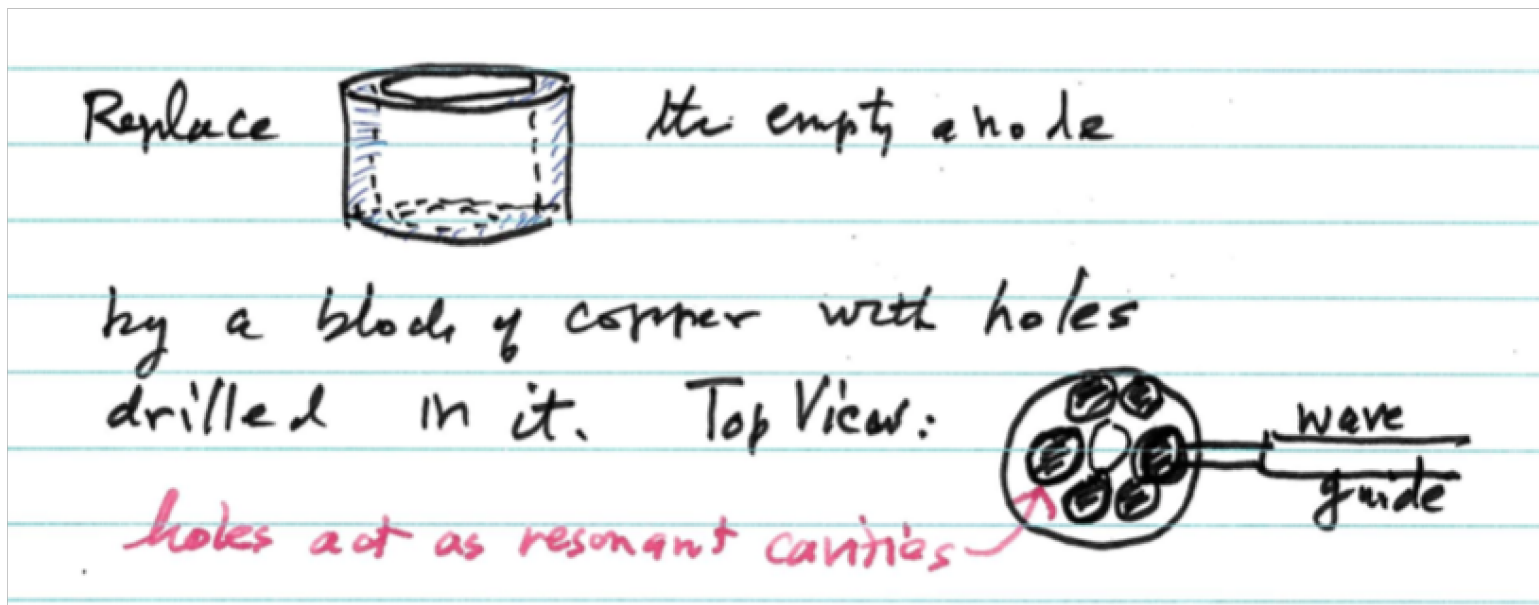
## ■ History

- Prehistory (1910 ; 1920's)



- History

J. Randall and H. Book, 1940;  
Birmingham, England



An important sort of *accidental* discovery!

Out[ ]=



## ■ The MIT Radiation Laboratory (1940-1945) (“Rad Lab”)

The UK and US had a joint project to produce microwave radar during WWII.

VHF : 30 to 300 MHz  $\Rightarrow \lambda \sim \text{meter}$

UHF : 300 MHz to 3 GHz  $\Rightarrow 1.6 \text{ to } 16 \text{ cm}$

Bowen, Lee  
DuBridge, and I.I. Rabi  
with a cavity magnetron  
from England (~1940)





# One goal was to detect bombers approaching England. Later improvements included air-born radar.

The SCR - 584 (short for Set, Complete, Radio # 584) was an automatic - tracking microwave radar developed by the MIT Radiation Laboratory during World War II. It was one of the most advanced ground - based radars of its era, and became one of the primary gun laying radars used worldwide well into the 1950 s.

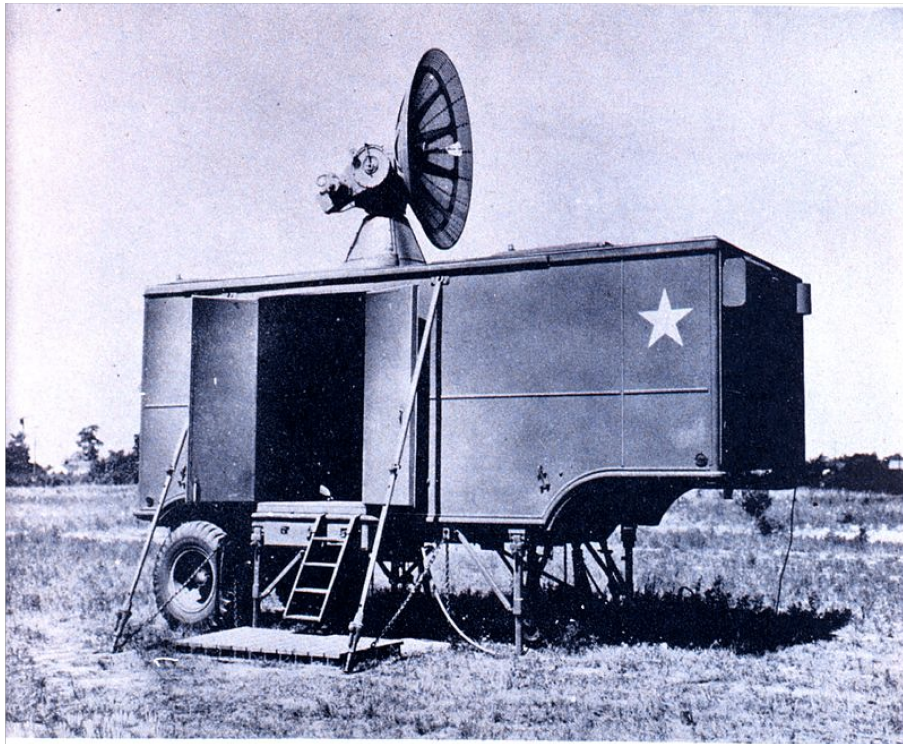
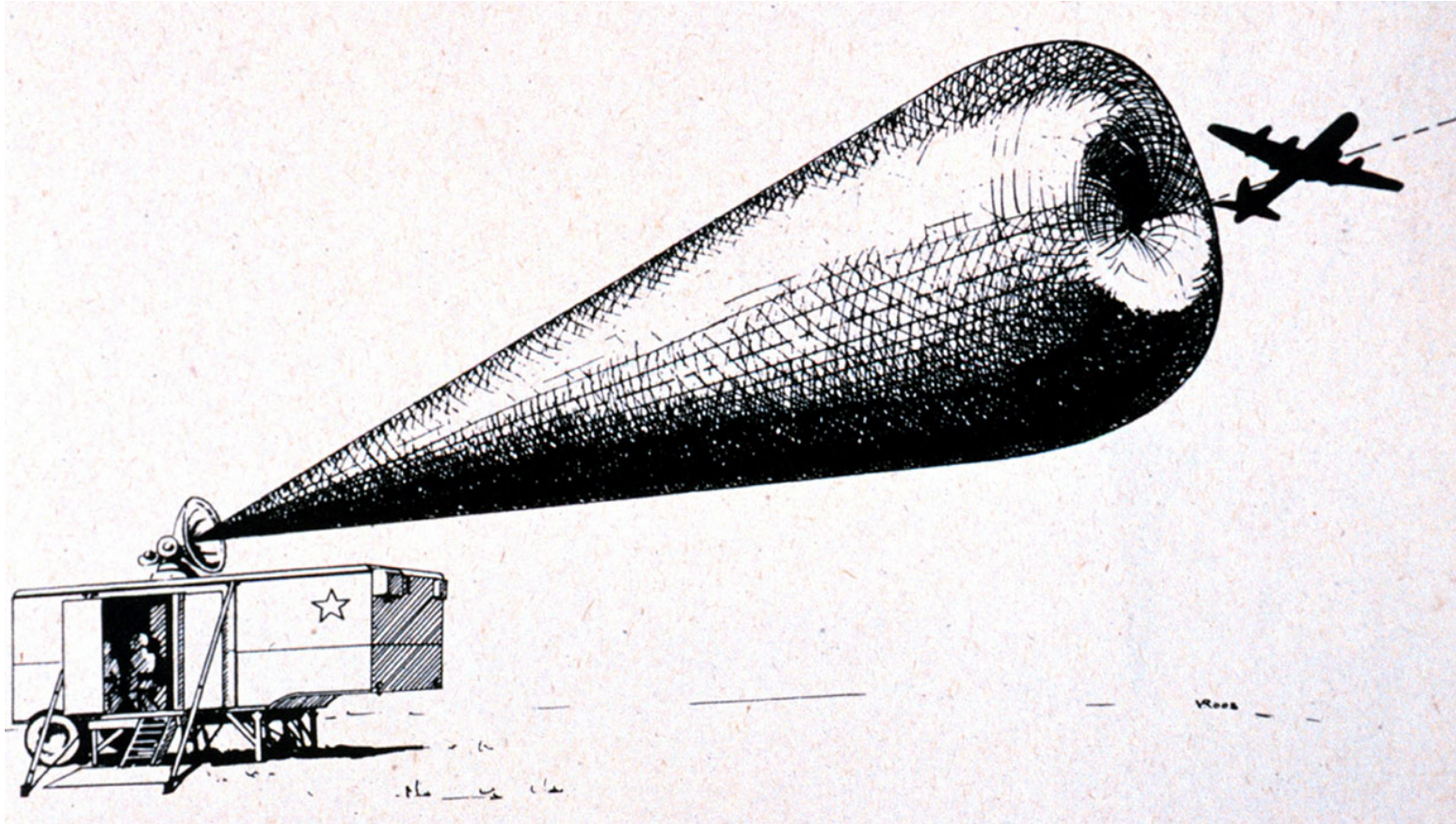


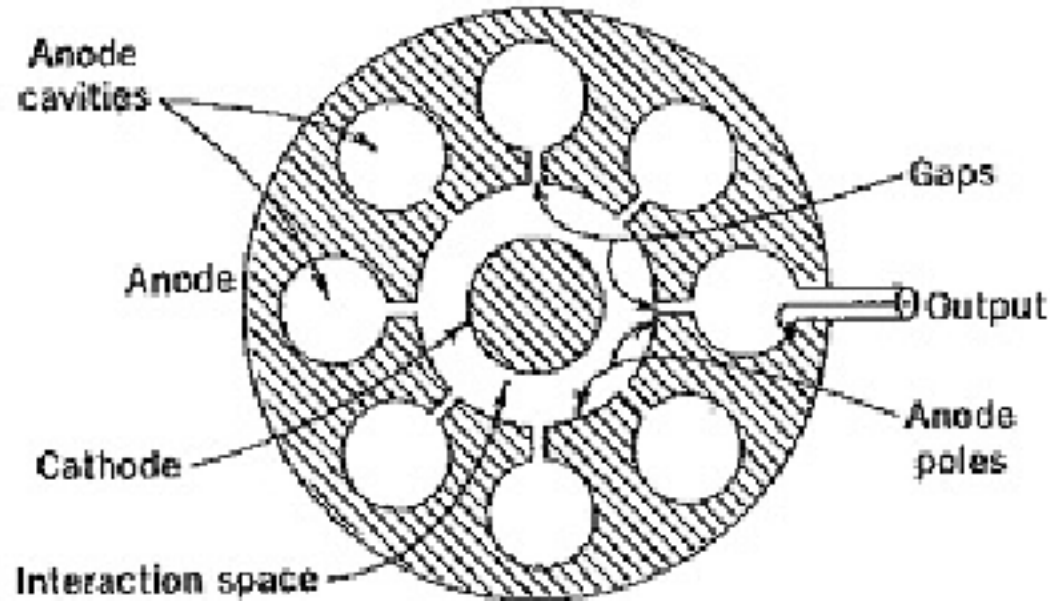
Figure 22. Exterior View of Radio Set SCR-584.

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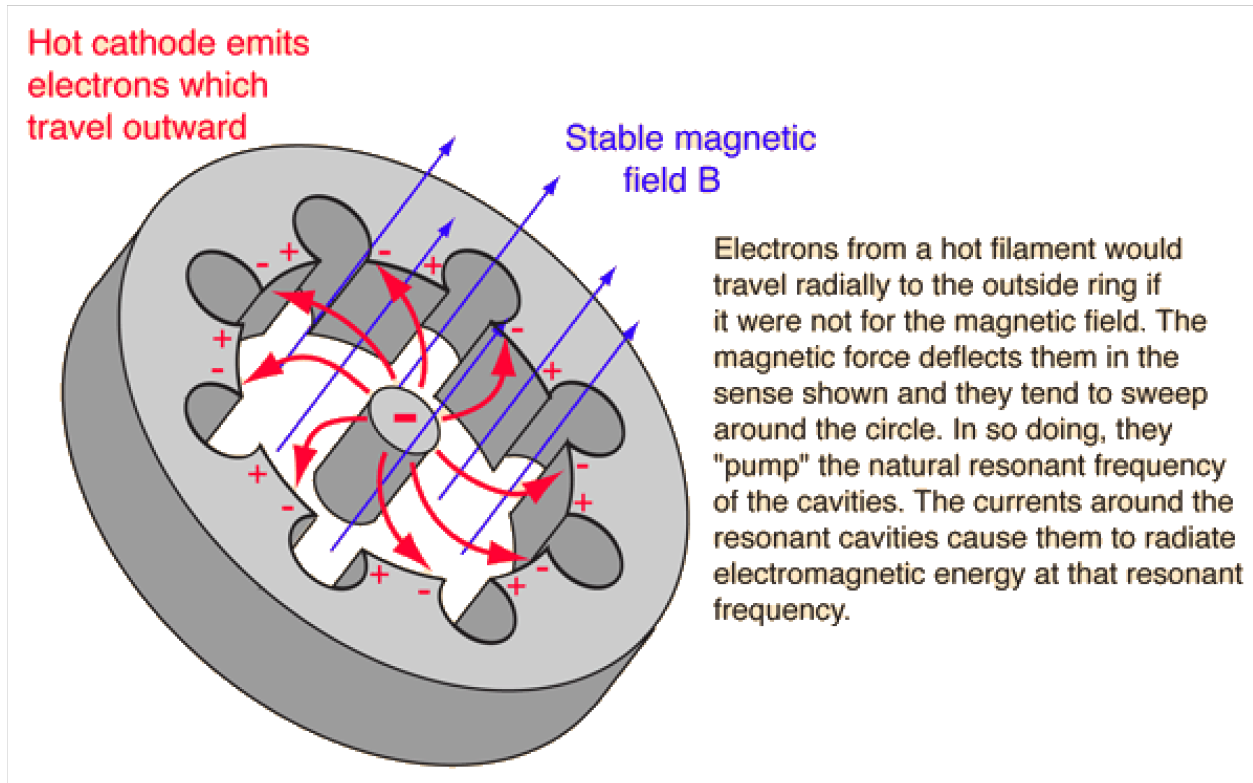
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- The role of the resonant cavities



**FIGURE 11-10** Cross section of hole-and-slot magnetron.

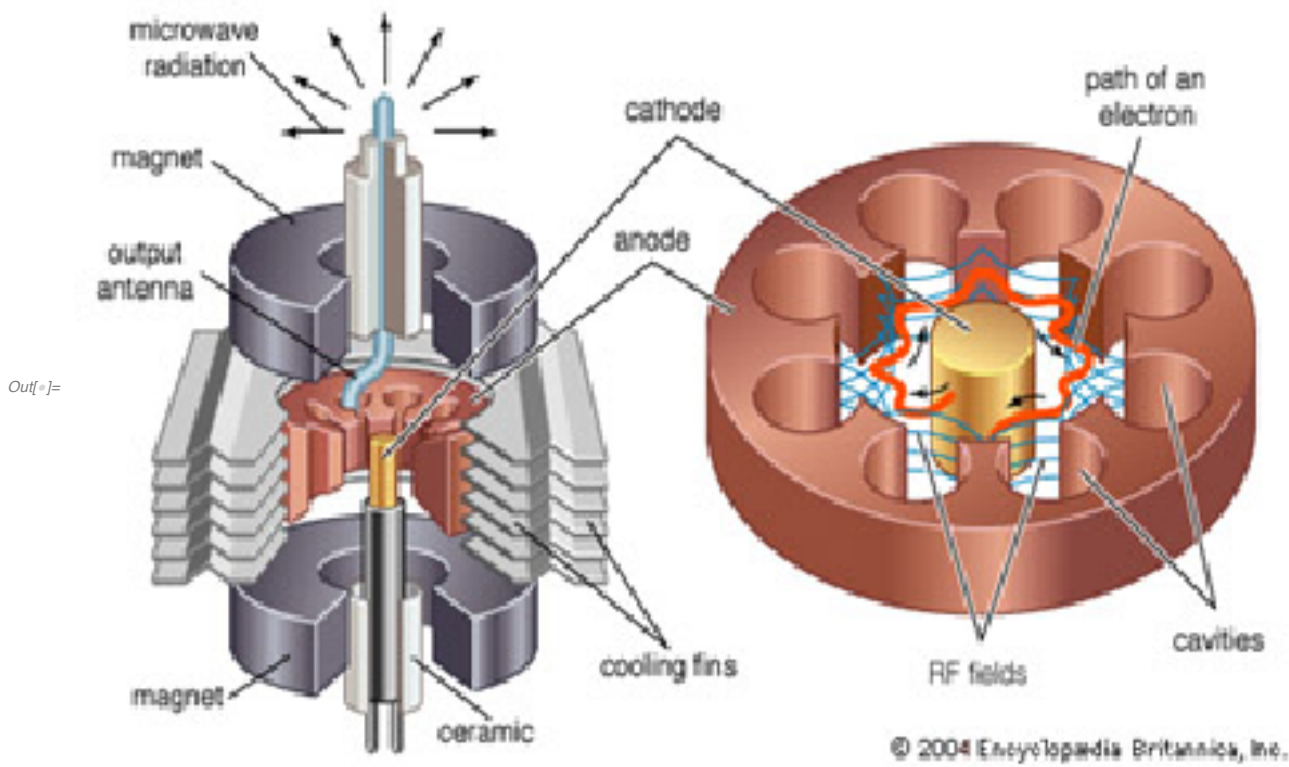
As the electron current passes a cavity, resonating fields are generated.



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It is a strongly coupled system with currents in the vacuum and in the copper, and fields in the cavity. It requires a “wholistic” theory.





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"It's like a whistle."

What happens when you blow over the open top of a coke bottle?

## Microwave applications that developed after WWII ...

- radar for civilian aviation
- MW ovens
- Doppler radar (speeding tickets; weather radar)



GE Microwave Oven Magnetron and Diode Kit OM75P (10) Part # WB27X10017

by GE

★★★★☆ 185 ratings | 161 answered questions

Amazon's Choice for "magnetron"

Was: \$49.96  
Price: **\$47.56** ✓prime & FREE Returns  
You Save: **\$2.40 (5%)**

Your cost could be \$37.56. Eligible customers get a \$10 bonus when reloading \$100.

**Note:** Available at a lower price from [other sellers](#), potentially without free Prime shipping.

- ONLY REPLACES MAGNETRONS LABELED OM75P (10) OR OM75S (10)
- This kit includes both the magnetron tube and diode.

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