

## GRIDLESS GAMMATRON

In the late 1920s, the Robert Dollar Steamship Company wanted to install powerful transmitters on all their ships and land stations. They approached Ralph Heintz, W6RH, to research circuits that wouldn't infringe on the existing oscillator patents. Heintz and his partner, Jack Kaufman, had formed Heintz and Kaufman in 1924. Dollar had possession of a patent for a "Simpson" oscillator through their acquisition of the Simpson Radio Co. The circuit worked, but RCA refused to sell them tubes. Heintz and other young engineers from UC Berkley and Stanford began research on a different type of tube that wouldn't infringe on the patents for the triode, the getter, the thoriated tungsten filament and the internal insulator. They explored the work done by Goddard, of rocket fame, and decided to build prototype tubes based on this research.

The new tube was to be much like a full wave rectifier with two large plates and a single filament. The filament was mounted very close to one plate they called a "gamma" plate. A conventional triode used a grid between the filament and plate to control the electron flow, but this tube utilized the gamma plate that had a high potential and created a field around it and the filament. Modulation or switching of the field would release electrons towards the plate. Both anodes were to be made from tantalum metal that had the nature of absorbing gas when operated at high temperatures. A pure tungsten filament and no internal insulators should solve the patent problems.

Heintz had hired some young hams to build their prototype tubes and they set up shop in South San Francisco. They chose the commonly available "250" watt envelope from Corning Glass and produced their first tubes. They worked, but the amplification factor was only 2 or 3 at best. Not a problem in a free running oscillator. The new tubes were a great success and could be run red hot, but were still underpowered for their intended application. They called their new tubes "Gridless Gammatrons". They made a few larger versions and eventually produced 1 KW transmitters for all of Dollar's ships and shore stations mostly using a tube named the HK-255. These tubes worked well at 1 KW with 5000 volts on the plate. None of these tubes were intended for public sale.

RCA was not pleased and quickly sued H&K. Seven RCA lawyers showed up for the trial, but Heintz had built an excellent set of demonstrations for this technology and before the trial started, they dropped the suit.

As the depression went on, the finances of Dollar slumped so Heintz convinced the company to start selling tubes to the public and make some money now that RCA had been found to be running a monopoly and was required to allow others to make gridded tubes. By 1934 they produced an excellent tube designated the HK-354 and sales looked promising, but Dollar's financial problems forced staff reductions. Two of the young hams that Heintz had hired and helped him set up the tube manufacturing, could see little future working for H&K so started their own tube making company. They were Bill Eitel, W6UF, and Jack McCullough, W6CHE, and their new company was called EIMAC.

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