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Improved Solid-State Triode Construction

The problem:

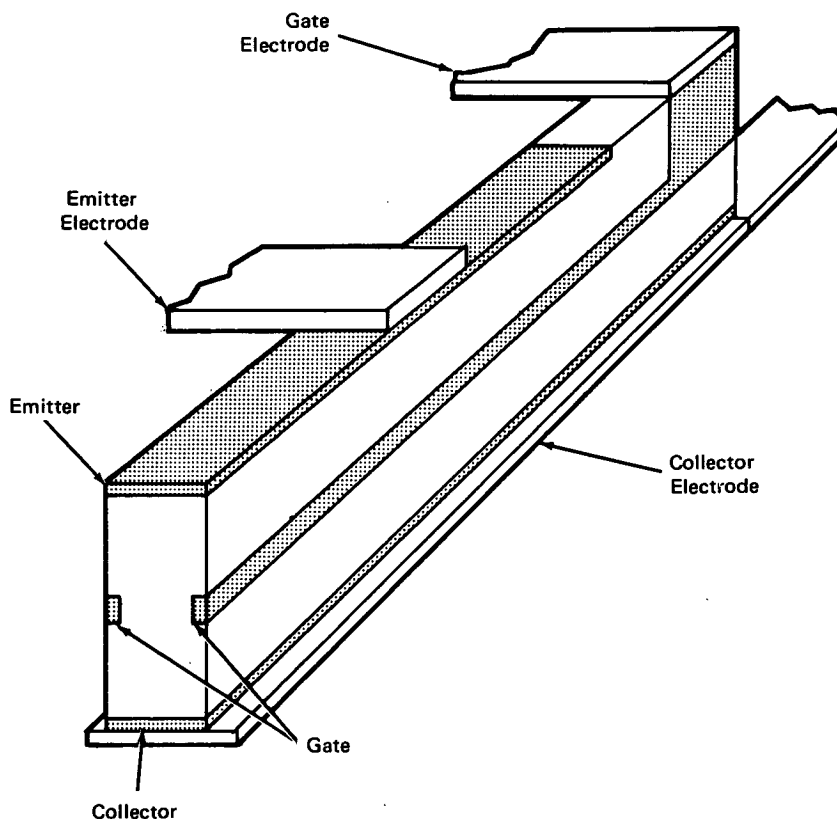
Germanium solid-state triodes are directly analogous in operation to the common vacuum-tube triodes. The fabrication of germanium triodes, however, has been difficult. The difficulty is in the forming of gate electrodes, which require an elaborate masking procedure to develop extremely narrow slots 0.03 mm wide on curved surfaces. Strips of n^+ doped material are subsequently alloyed into the slots.

The solution:

A new triode configuration has been developed which simplifies the fabrication of the solid-state triodes.

How it's done:

Basically, the triode, as shown in the schematic, is constructed from a rectangular filament made of near-intrinsic n -type silicon. The collector and the emitter are formed on the opposite faces of the filament and



Improved Solid-State Triode

(continued overleaf)

are spaced approximately 0.13 mm apart. The gate electrodes are alloyed to the filament and extend longitudinally along the midsection of the other two opposite sides, approximately 0.06 mm apart.

Because of its rectangular shape, the device is simple to mask during fabrication. A single device is made using a wafer approximately 0.15 mm thick. The emitter and collector electrodes are applied to the opposite faces of the wafer by alloying. The wafer is subsequently parted into a rectangular configuration in slices approximately 0.06 mm wide. Masking then is applied to the sides and faces, and the gate electrodes are formed by alloying. The contacts of the device are attached in the final stage.

Note:

Requests for further information may be directed to:
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Pasadena, California 91103
Reference: TSP74-10107

Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457 (f)], to the California Institute of Technology, Pasadena, California 91103

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under contract to
NASA Pasadena Office
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