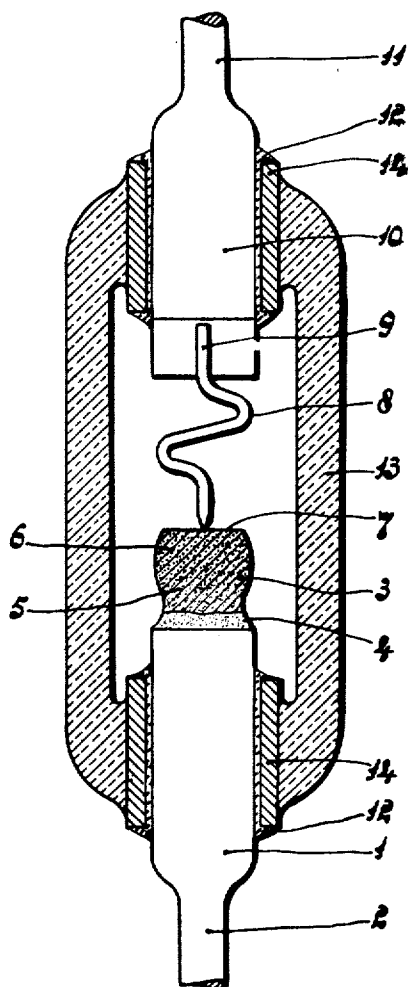


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A. VAN WIERINGEN
SEMI-CONDUCTOR ELECTRODE SYSTEM

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AGENT

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SEMI-CONDUCTOR ELECTRODE SYSTEM

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2 Claims. (Cl. 317—236)

The invention relates to semi-conductors, and, in particular, to electrode systems for granular semi-conductors, such as crystal diodes or transistors.

A known method of manufacturing granular semi-conducting bodies, e. g., of germanium or silicon, results in a more or less egg-shaped body, the narrow top of which has a much higher concentration of impurities than the wider lower portion, that is to say, the impurities in the semi-conducting body which adversely affect its electric properties, for example, its rectifying properties, are lumped in the top of the body or grain. In British Patent No. 683,248, it has been proposed to mount the egg-shaped body with the top projecting outwardly from the metallic support and to remove the top with its undesirable impurities to form a contact surface.

The present invention is based on the discovery that it is possible to take advantage of the presence of these undesirable impurities by securing the narrow top of the body to a base electrode, since a rectifying junction at this area is undesirable. The electrode system according to the invention, therefore, comprises an egg-shaped semi-conducting body, the narrow end of which has a higher concentration of impurities than the wider end. A good electrical ohmic connection is effected to the narrow end, i. e., it is secured to a base electrode, and the wider end is flattened, e. g., by grinding, for the purpose of effecting a rectifying connection thereto.

The advantage of the construction according to the invention is that, not only are the impurities in the semi-conductor arranged in a zone in which they are not harmful, but their presence is actually utilized to reduce the contact resistance to the base. It is preferred that the flattened, wider part of the egg-shaped body contains no impurities, i. e., it consists solely of pure semi-conducting material, since this reduces the risk that this surface may become contaminated.

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The invention will now be described with reference to the accompanying diagrammatic drawing in which the single figure is a sectional view of one embodiment of the invention.

Referring now to the drawing, the electrode system of the invention comprises a rod-shaped base electrode 1 provided with a supply conductor 2 and having a granular semi-conducting body 3 secured to it by means of solder 4. The body is egg-shaped and has its head on the top portion 5 adjacent the base 1. Its wider upper end 6 is flattened, for example, by grinding, at 7. The higher concentration of impurities in the head 5 is denoted by cross-shading.

A pointed electrode 8 positioned on the semi-conducting body 3 and forming a rectifying connection therewith is welded at 9 to a rod 10, which, similar to the base 1, is provided with a supply conductor 11. The rods 1 and 10 are secured by means of solder 12 in a holder constituted by a glass tube 13 which has sealed in it two aligned metal tubes 14 made, for example, of ferrochromium.

It will be appreciated that the invention is not limited to the arrangement of the base 1 and the pointed electrode 8 as shown in the drawing, nor to electrode systems comprising a single pointed electrode, but will be applicable also to three or four electrode systems, such as transistors and the like.

What is claimed is:

1. A semi-conductor device comprising a granular, egg-shaped, semi-conductive body of which the narrow head has a greater concentration of impurities than the opposite end, said opposite end having a planar portion, means effecting a rectifying connection at the planar portion, and means effecting an ohmic connection at the narrow head.

2. A device as set forth in claim 1 wherein the semi-conductive body comprises an element selected from the group consisting of germanium and silicon.

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