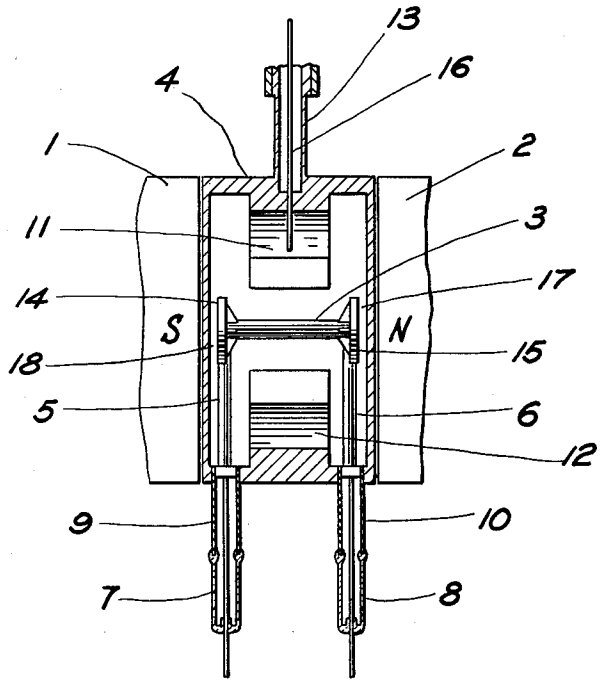
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MAGNETRON

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MAGNETRON

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My invention relates to magnetrons. More particularly, the invention relates to magnetrons employing a radially mounted cathode and external magnets and includes means for improving the vacuum inside the magnetron under operating conditions.

The invention will be described in connection with the accompanying drawing which shows a magnetron according to the invention.

The magnetron shown in the drawing is of the radial cathode type employing external magnets 1, 2. The cathode 3 is supported within a hollow anode block 4 by lead-in conductors 5 and 6 sealed through glass seals 7 and 8 mounted at outer ends of pipes 9 and 10 hermetically fastened within the walls of the block 4.

Anode block 4 is provided with a plurality of slots 11 and 12 concentric with the cathode such that when the device is energized, oscillations are set up therein. These oscillations may be led out of the tube by means of a coupling loop which extends into one of the cylindrical openings 11 and extends into and is hermetically sealed in a pipe 13.

Discs 14 and 15 constituted of a getter material such as zirconium or titanium are provided on both ends of the cathode spaced from the walls of block 4 by at least several millimeters. Stray electrons penetrating into the spaces 17 and 18 between the discs 14 and 15 and the block 1 will be spiralled by the axial magnetic field providing in this way an enhanced probability to ionize residual gas particles.

Since there exists also in spaces 17 and 18 an axial D.-C. field, because of the D.-C. potential applied between the anode and cathode, these positive ions will be accelerated toward the discs or end shields 14 and 15 and absorbed there by getter action.

This tube can be considered, therefore, as having two built-in ion pumps.

It is essential only that the external surfaces of the end shields be covered with gettering material in order to attract the ions. Good results are obtained, for example, by using molybdenum caps covered with zirconium or titanium powder.

It is not necessary for good results to operate with the end shields at elevated temperatures. In fact, best results are obtained when these shields are in poor thermal contact with the hot cathode.

Furthermore, where some end emission is desired, the internal surfaces of the end caps should not be coated with materials such as zirconium or titanium.

The tube in accordance with the invention has a materially shortened required aging time, i.e. the time required to exhaust the tube before it is ready for operation. Typical tubes according to the invention have an aging time which is approximately 20% of that of comparable tubes not made in accordance with the invention.

The foregoing embodiment is illustrative only, the invention being defined by the appended claims which should be construed as broadly as possible in view of the art.

What I claim is:

1. An electron discharge tube comprising a hollow anode block for producing a D.-C. field and having a plurality of slots in which oscillations can occur, a cathode disposed within said anode block concentric with said slots, field producing means external to said anode block for producing a magnetic field coaxial with the cathode, and end shield members adjacent the ends of said cathode between said cathode and said anode block and spaced from said anode block, said end shield members having at least surface portions thereof constituted of a material adapted to absorb residual gases ionized by the D.-C. field.

2. An electron discharge tube comprising a hollow anode block for producing a D.-C. field and having a plurality of cylindrical openings in which oscillations can occur, a cathode disposed within said anode block concentric with said slots, field-producing means external to said anode block for producing a magnetic field coaxial with the cathode, and end shield members positioned at the ends of said cathode and spaced from said anode block, the external surfaces of said end shield members being constituted of a material adapted to absorb residual gases ionized by the D.-C. field.

3. An electron discharge tube comprising a hollow anode block the producing a D.-C. field and having a plurality of slots in which oscillations can occur, a cathode disposed within said block concentric with said slots, field producing means external to said anode block for producing a magnetic field coaxial with said cathode, and end shield members positioned at the ends of said cathode and spaced from said anode block, said end shield members being constituted of refractory metal covered on the external surfaces only with a material which is adapted to absorb residual gases ionized by the D.-C. field.

4. An electron discharge tube comprising a hollow anode block for producing a D.-C. field and having a plurality of slots in which oscillations can occur, a cathode disposed within said block concentric with said slots, field-producing means external to said anode block for producing a magnetic field coaxial with said cathode, and end shield members positioned at the ends of said cathode and spaced from the anode block, said end shield members being constituted of molybdenum, the external surfaces only of said end shield members being covered with a material which is adapted to absorb residual gases ionized by the D.-C. field.

5. An electron discharge tube comprising a hollow anode block for producing a D.-C. field and having a plurality of slots in which oscillations can occur, a cathode disposed within said anode block concentric with said slots, field-producing means external to said anode block for producing a magnetic field coaxial with the cathode, and end shield members positioned at the ends of said cathode and spaced from said anode block, said end shield members being constituted of molybdenum, the external surfaces only of said end shield members being covered with zirconium for absorbing residual gases ionized by the D.-C. field.

6. An electron discharge tube comprising a hollow anode block for producing a D.-C. field and having a plurality of slots in which oscillations can occur, a cathode disposed within said block concentric with said slots, field-producing means external to said anode block for producing a magnetic field coaxial with the cathode, and end shield members positioned at the ends of said cathode and spaced from said anode block, said end shield members being constituted of molybdenum, the external surfaces only of said end shield members being covered with titanium for absorbing residual gases ionized by the D.-C. field.

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