trough at some accelerating voltage. By the rough estimation of the intrinsic kinetic energy of incident electron, it seems reasonable that the appearance of the trough is due to thd excitation of the electrons from the impurity level to the conduction band.

In order to confirm this fact we repeated the same dxperiment concerning (BaSr)O emitter instead of ThW. We have found also in this case that the resistance change curve shows the same behaviour i. e. the curve shows minimum at about 0.2 volt and then increases up to the value for non-bombardment with increasing applied voltage. Above 0.7 volt the resistance does not change by the bombardment of electrons.

In order to calculate accurately the intrinsic kinetic energy of incident electron, which causes the trough, from the observed value of applied voltage, 0.2 volt, we must take into account various correcting terms, (such as contact potential difference between the sample and the emitter, and its variation by some reasons, and initial velocity distribution of incident electrons and charging up the sample surface and so on). These estimations are now in progress.

To explain the question why the resistance does not change above 0.7 volt, we observed the resistance and the secondary emission against the applied accelerating voltage simultaneously. Then we found the closely-related agreement between the behaviour of the curves of resistance and the secondary emission. It seems, therefore, that qualitatively the impurity level plays an important role for the secondary emission from (BaSr)O.

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45. On the Characteristics of Ionization Chamber with Screen-Grid. (I)

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In the experiment when a large-sized or high pressure ionization chamber are filled with electronegative gases, difficulties arise in attaining the voltage saturation. The characteristics of ionization chamber with screen-grid were studied, both theoretically and experimentally, to overcome these difficulties. The essential advantage of this chamber is that the voltage required is proportional th the depth instead of the square of it as in the case without the grid.

The causes of the inhomogeneity of the pulse heights i. e. the inperfection of the shielding effect of the grid and the rate of ions captured by the grid were analysed theoretically. The validity of the theory was acertained experimentally with several chamders having different shieldings.

The experimental results worthy of notice is that the inhomogeneity due to the inefficiency of the grid shielding for the electronegative gases is much smaller than in the case of electron collection owing to the fact that in the former case both positive and negative ions are utilized if the amplifier time constant is properly chosen. This fact makes it possible to use a grid of low shielding effect which consequently allows the use of relatively low voltage, the essential requirement in the electronegative gases, to prevent the capture of ions.

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46. E_p-I_p Characteristic Curves of Magnetron.

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Magnetron M-312 (wave length 10 cm), operated by D.C. anode voltage and A.C. (60 cycle) cathode voltage, was used, and E_p-I_p characteristic curves on the screen of the Braun-tube were observed in the following various cases.

1. Difference between the static and the dynamic characteristic curves.
2. Complicated phenomenon in the neighbouring region of the dynatron characteristic curve.
3. Change of the characteristic curve of the inclination of the tube axis against that of the external magnetic field.
4. Change of the characteristic curve against that of load impedance.
5. Change of the characteristic curve against that of the filament current.
6. Oscillation region on E_p-I_p characteristic curve.

Sufficient analyses have not yet been obtained about the above phenomena on account of their complexity except the following phenomena.

7. Figures of characteristic curve were changed by the reversal of the direction of the operating magnetic field, phase of the heater voltage or phase of A.C. voltage operated in the cathode, but figures after the reversal were same.

It was found that this was due to the effect of the magnetic field which was produced by the hecter solenoid. Calculated values of this magnetic field are -500 gauss at the center of the heater solenoid, 10 gauss at the center between the anode and the cathode, and 2 gauss at the anode. In this case the heater was 0.28 cm in diameter, 1.4 cm long, with twenty turns, and the maximum peak current was $20\sqrt{2}$ ampere.

Although this magnetron is operated by D.C. anode voltage only, the out-put will be modulated with 60 cycle according to the A.C. magnetic field of the heater solenoid which is heated by A.C. current of 60 cycle. Also in the case of the pulse