

discharge develops. In connection with this, as a result of the heating of the cathode, electrons emitted from energy levels above the Fermi level begin to play the major role, i.e., a transition from the cold to the thermionic emission mechanism occurs. The characteristic times of transition from the high-velocity to the low-velocity spots are determined by the characteristic times of heating of localized areas of the surface of the cathode and by the conditions which determine the scattering of the vapor by the surface of the spot.

In view of the fact that the condition for the activity of a spot is determined by the conditions under which ions are produced, the use of additives with large ionization cross sections sharply lowers the loss of cathode material.

Thus the dynamics of the development of emission and erosion processes on the cathode is determined by the dynamics of the appearance and movement of ions in the near cathode region and the dynamics of the heating of the electrode. By changing the parameters that determine these processes, i.e., by using materials with the requisite thermo-physical and atomic constants, we can control the dynamics of the development of cathode processes.

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Ya. A. Ryftin. Prospects for a Radical Increase of the Resolving Power in Television.

The quantity of information obtained through television depends on the resolving power of the television

system, which is determined, in the first place, by the resolving power of the transmitting TV tube.

The resolving power of existing tubes does not satisfy the ever-increasing requirements. It is not even high enough for the realization of the potentialities of standard 625-line television, and as a result, the quality of TV broadcasts does not exceed 25% of its possible value^[2], while for the solution of many important problems (cosmic, holographic, motion-picture TV, etc), tubes with resolving power at least one order higher are already needed.

All the known methods of raising the resolving power have almost been exhausted. In this paper we describe new ways of solving the problem^[1]. They are based on the "pulsation effect - the adaptation of the spots on the charged screen of a cathode-ray tube"^[3], established by this author, the main points of which are as follows. The beam storage tube works only when the scanning electron beam contains an alternating passive part, which serves as the reserve buffer that forms the information-carrying component of the video signal. Under these conditions, the tube target is discharged primarily by the front active part of the electron beam, the size and form of which adapt themselves to the displacement (number) of lines and to the mode of scanning, and pulsate together with changes in charge density in the scanned parts. On the basis of this effect, we propose a new principle for tube improvement which leads to an increase in the ratio, unlike the known methods, which always worsen this ratio.

A new method of transmission is also proposed. It comes down to a multi-line scanning of the height-anamorphized image picture on a large spherical target of a wide-angle tube, which the author calls "sphericon." The angular deviation of the scanning beam in a sphericon increases in direct proportion to the number of lines and to that distance between the lines at which the preliminary plotting of the changes, which limits the resolving power, decreases to the optimum value.^[4]

Thus, real prospects present themselves for the construction of transmission TV tubes of very high resolving power (up to 10,000 lines and more). Such tubes are indispensable not only for solving the applied-television problems noted above. They will make possible a radical improvement in the quality of television broadcasts. By means of high-frequency oscillation of a small spot of a sphericon, it will be possible to effect a standard 625-line scanning by a "small slit" and to increase the quality of the telecase by a factor of four or more with respect to the present quality. And all that without the necessity for innovating or changing the existing television studios and television sets!

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