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TRIP TO RCA, Thursday, August 26, 1954

The following went to RCA, Princeton for the color tube discussion: L. R. Fink, I. J. Kaar, C. G. Lob, L. C. Maier and J. C. Nonnekens.

The RCA people with whom we spent most of our time were: Engstrom, Epstein, Ewing, Law and Ramberg.

The two main items under discussion in this trip were Post Acceleration tubes and projection. Most of the considerations regarding general color tube types were covered during RCA's previous visit to Syracuse, so that this report will consist only of the technical information obtained plus the writer's impressions of the pictures shown.

A- Double Grid Post Acceleration Tube

This was built into a 19" round metal envelope and consisted of two sets of grids perpendicular to one another and separated by approximately 1/8". The operating potentials on the tube were 20KV on the cone, 15KV on the first grid (toward the gun) and 20KV on the second grid and phosphor screen. This mechanical and electrical configuration eliminates virtually all of the secondaries and back scattered primaries which cause loss of contrast in our single grid tube. There is no question that by adding this additional complication and expense a better tube is obtained, however, the question of most interest to us was how much better. The impression obtained was that in a room with little or no background illumination their tube would appear superior because of increased contrast. However, the moment room lights are switched on or there is a slight residual background because of circuit adjustments, this increase in contrast is not evident. The opinion, therefore, was that the improved performance in a dark room does not warrant the additional cost and complexity of adding a second grid. Furthermore, neither RCA or ourselves have thought of a suitable mechanical scheme for using a double grid principle while putting phosphor on the face.

B- Projection

We saw a very good projection picture which was based on the optical principles explained by Epstein on RCA's previous visit to Syracuse. They claimed 30 foot lamberts brightness as viewed on a screen which had about a 5 to 1 gain. Epstein made the statement that if some of the money spent in the development and capital equipment outlay for the direct view tube were funneled to the optics required for projection that a competitive projection set would be on the market now.

C- Details

We learned two processes which appear interesting for our Laboratory Tube Development:

(I) Wire fastening - RCA first winds their frame and then attaches the wires by merely electroplating the entire structure, applying suitable stop-off lacquer to that portion of the structure on which the plating is to remain and then dissolving away the unwanted plate. Their process consists of:

1) Clean structure in alkali cleaner at reduced temperature (140 to 150°F draw current).

2) Rinse in hot water.

3) Dip 50% Hydrochloric acid.

4) Rinse.

5) Dip 10% Sodium cyanide.

6) Rinse.

7) Dip 10% Sulphuric acid.

8) Rinse.

9) Nickel flash.

10) Rinse.

11) Copper plate (acid bath) at a current of approximately 15 to 20 amp. per sq. ft.

The frames made by this process looked very good indeed. The only caution was that means have to be provided to insure contact between the wire and the frame during the plating.

(II) Electron Exposure - The printing master for the tube which we saw was made by an electron exposure. The exposure is made on a pre-treated Kodalith photographic plate in the demountable station. Their pre-treatment consists of the following:

1) The plate is dipped in eosin dye. Eosin is the trade name for tetrobromofluorocein. This treatment lowers the light sensitivity of the plate by more than 100.

The next step is to make the plate conductive. This is done by taking it out of the dye and emersing it into a suspension of aquadag and water. The plate is then dried. The plate is not conductive but by burnishing the surface with a cotton wad it then becomes conductive and can be used. The exposure is 25 microamperes for 20 seconds using a scanned raster. After this, the standard Kodalith development process is followed and during this process the aquadag comes off.

Chester G. Lob
Electron Tube Section
ELECTRONICS LABORATORY

CGL:mg

Sept. 3, 1954

Distribution:

Those present and -

W. R. G. Baker
L. T. DeVore
J. P. Jordan

September 10, 1954

MEMO:

The previous memo on trip to RCA, 8/26/54, was in error. The first page, 4th paragraph, discussion of their double grid tube operating potentials should read:

> "The operating potentials on the tube were 15KV on the cone, 20KV on the first grid (toward the gun) and 15KV on the second grid and phosphor screen."

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