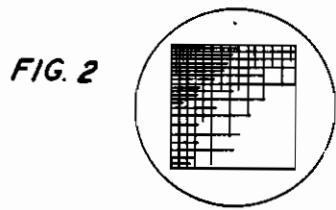
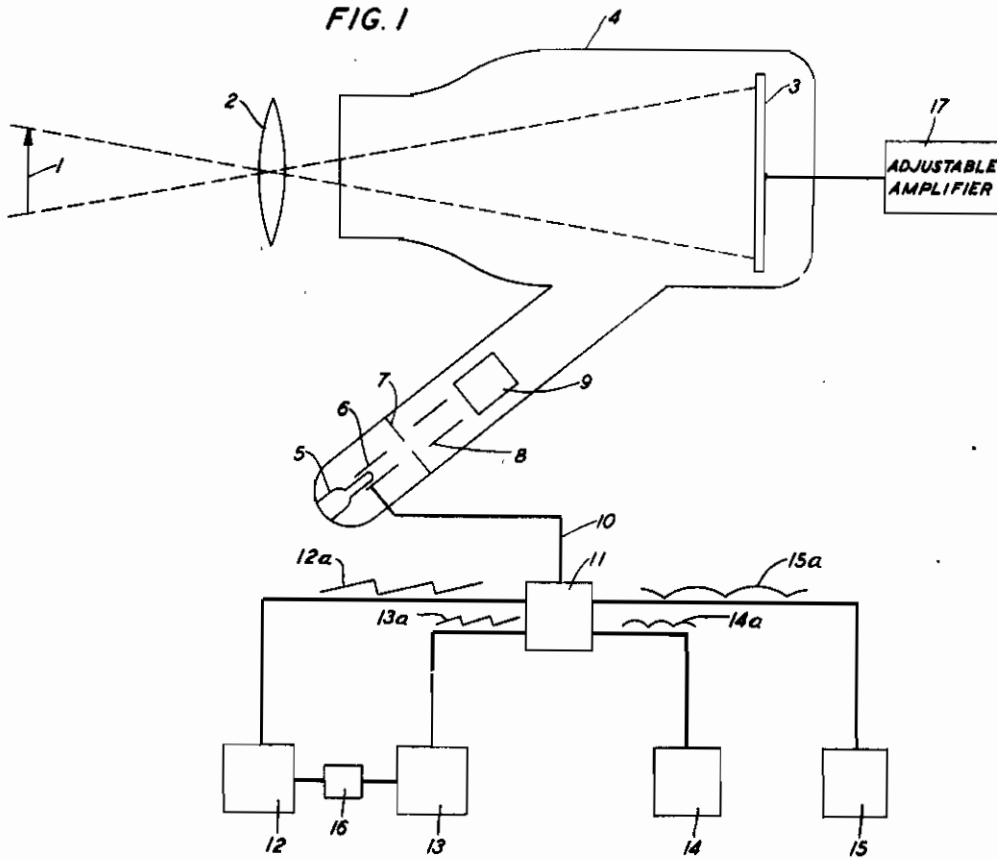


PUBLISHED
JUNE 8, 1943.
BY A. P. C.

R. R. VON FELGEL-FARNHOLZ
BLACK SPOT CORRECTING MEANS
Filed Feb. 12, 1942

Serial No.
430,569



INVENTOR
R. VON FELGEL-FARNHOLZ
BY
Charles Sprague
ATTORNEY

ALIEN PROPERTY CUSTODIAN

BLACK SPOT CORRECTING MEANS

Richard Ritter von Felgel-Farnholz, Teltow-
Seehof, near Berlin, Germany; vested in the
Alien Property Custodian

Application filed February 12, 1942

My invention relates to television systems and particularly to television systems of the type in which a cathode-ray transmitter tube using the storage effect is employed.

It is well known that, in television transmission systems comprising cathode-ray transmitter tubes using the storage effect, there will occur, in the picture received, visual disturbances which become manifest in an irregular distribution of brightness within the scanned area. This phenomenon of irregular brightness distribution will be particularly distinct in cases when the light-sensitive layer is everywhere illuminated with equal brightness. For example, one corner of the picture may be of a very dark shade, while the corner diagonally opposite may be of a very light shade. This phenomenon is commonly referred to as "black spot."

It is, accordingly, an object of my invention to provide a method of and means for correcting, or otherwise controlling, the shading of a television picture.

It is a further object of my invention to provide an improved method of and an improved means for preventing the transmission of undesired signals from the picture transmitter.

In accordance with the invention, in a cathode-ray transmitter tube serving for the transmission of television programs and the like, the intensity of the electron beam scanning the storage electrode is so controlled that the picture modulation effected by the intensity control will be directly opposite to the picture modulation producing the black spot, so that, at the output of the cathode-ray transmitter tube, a picture signal practically free from disturbing signals is obtained. It is advisable to effect the modulation of the electron beam scanning the storage electrode by means of a perforated diaphragm, preferably the Wehnelt cylinder. For this purpose a modulating potential is admitted to the beam modulating electrode, said potential being advantageously generated by means of signal generators whose output currents are mixed with one another across control elements.

Other objects, features and advantages of my invention will appear from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a circuit and block diagram of a television transmitter embodying my invention.

Fig. 2 shows the undesired black spot at the television receiver.

Referring to Fig. 1, an optical image of object 1 to be teletransmitted is produced, by means of

optical system 2, on storage electrode 3 of a cathode-ray transmitter tube 4 of the type described in an article by V. K. Zworykin published in the January, 1934, issue of the Proceedings of the Institute of Radio Engineers. Within that tube an image of electrical charges is generated, said charges corresponding, in their respective distribution, to the brightness distribution of the scanned object. The charge stored on the storage electrode is taken off by means of an electron beam generated in a gun comprising a cathode 5, a Wehnelt cylinder 6 and a first anode 7. Under the influence of the deflecting voltages supplied to pairs 8 and 9 of deflecting plates the scanning beam is moved line by line across the storage electrode.

The intensity of the scanning beam can be varied by means of electric control signals, which are applied to Wehnelt-cylinder 6.

Said electric control signals of suitable form and frequency are fed to the Wehnelt cylinder across line 10, the phase of said signals being so chosen and their amplitude so dimensioned that the disturbing spurious signals otherwise resulting at the output of the cathode-ray transmitter tube will be balanced out and disappear for this reason. By means of a mixing device 11 which may serve also for coupling purposes the electric control signal is composed of auxiliary signals. The auxiliary signals are generated by means of signal generators 12, 13, 14, and 15 which generate e. g. saw-tooth curves of picture frequency according to curve 12a and such of line frequency according to curve 13a as well as sine-shaped half-waves of line frequency and picture frequency according to curves 14a and 15a. Furthermore, a variable modulating device 16 has been provided, in order to modulate the amplitude of the saw-tooth oscillations produced by generator 13, in the rhythm of the line frequency (i. e. in proportion to the amplitude of the signals represented in curve 12a).

In certain cases, especially when the disturbing signals have a considerable amplitude so that, for compensating the black spot, the electron beam which effects scanning must undergo a relatively high degree of modulation, it is of advantage the gain of at least one stage of the picture modulation amplifier may be varied. The amplification should be controlled in dependence of the amount of the compensating voltage required at any particular instant. Thus the gradation curve of the picture received will be practically the same at all spots of the scanned area of the picture and independent of the disturbing signal

amplitude which is characteristic for the respective picture spot as well as independent of the modulating voltage amplitude required for compensation.

The causes of the so-called black spot have not been completely explained as yet; probably it is caused by an irregularity of the spatial charge cloud being developed in the surroundings of storage electrode 3. This irregular distribution may result from the gravitational field of the earth and from the leap in potential resulting at the discharge of each of the storage elements.

Often, there will arise a disturbance effect as per Fig. 2, i. e. the storage electrode being uniformly illuminated, e. g. the area near the left and the upper edges of the picture surface is being illuminated brighter than the area near the two other edges. For compensating this form of the black spot signals according to curves 12a and 13a are mixed and applied to Wehnelt cylinder 6.

RICHARD RITTER VON
FELGEL-FARNHOLZ.