

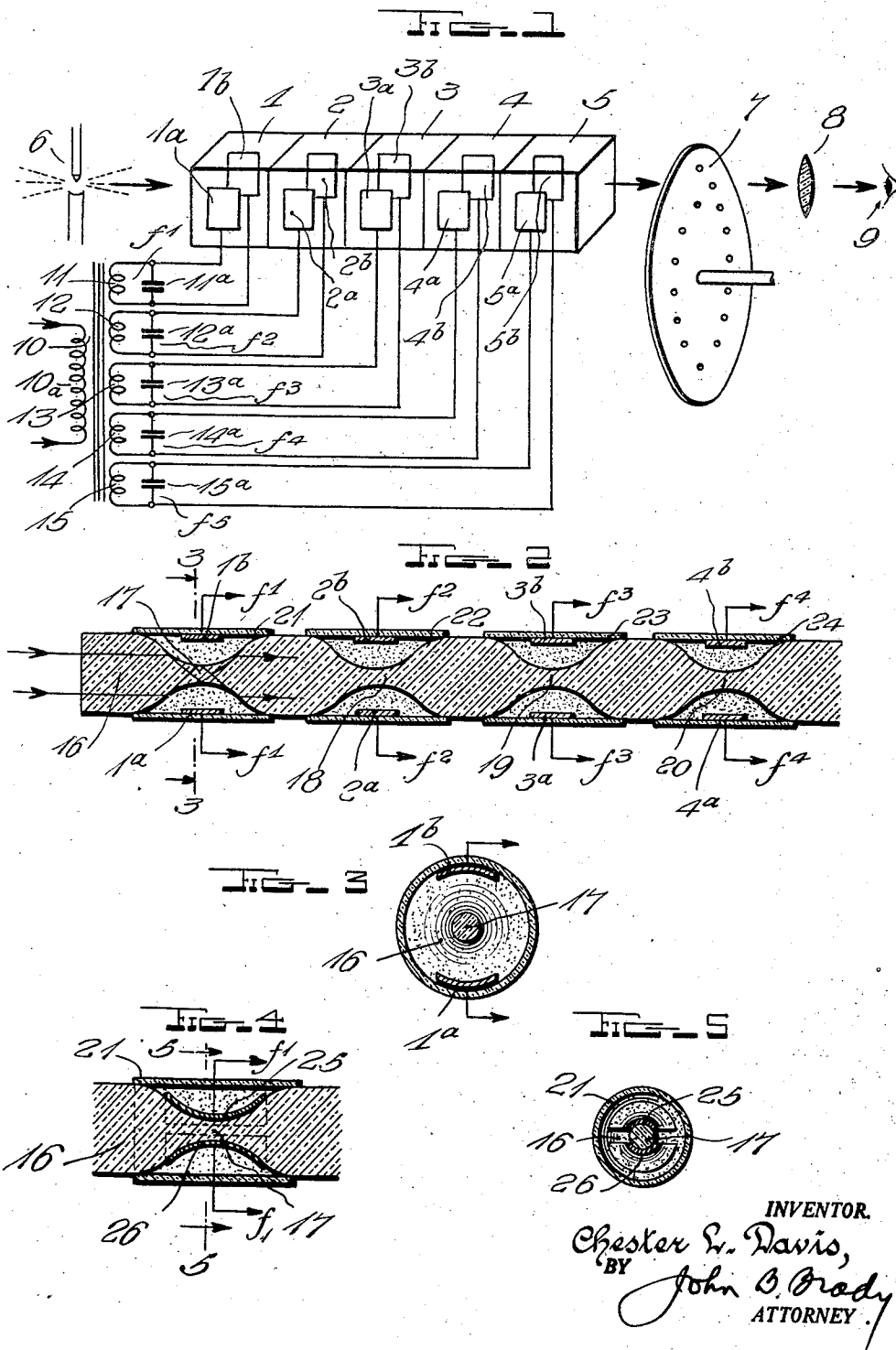
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TELEVISION SYSTEM

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UNITED STATES PATENT OFFICE

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TELEVISION SYSTEM

Application filed July 25, 1930. Serial No. 470,720.

My invention relates broadly to television systems and more particularly to an image reproducing television receiving system.

No. 460,760, filed June 12, 1930, for television system. The principle on which the television system of my invention operates will be understood more fully by reference to my Letters Patent No. 1,756,086, dated April 29, 1930, for signaling system.

Referring to the drawing in detail, reference character 10a designates the primary winding of a transformer 10 which connects to the output circuit of a power amplifier in the television receiver. In the particular arrangement illustrated, transformer 10 operates at radio frequencies but it will be understood that the transformer may be arranged for operation at audio frequencies. The transformer 10 has a multiplicity of secondary windings designated at 11, 12, 13, 14 and 15 each shunted by individual condensers at 11a, 12a, 13a, 14a and 15a. Each of the individual circuits are made resonant for a particular frequency within the band of frequencies over which the television receiving circuit responds. The circuits are designated as responding to frequency f_1 , f_2 , f_3 , f_4 , and f_5 . The glow discharge tube of my invention is designated as including a multiplicity of evacuated vessels disposed adjacent each other as represented at 1, 2, 3, 4 and 5, each vessel being filled with a different gas having individual color characteristics under conditions of ionization. For example, vessel 1 may be filled with argon, vessel 2 may be filled with krypton, vessel 3 may be filled with neon, vessel 4 may be filled with helium and vessel 5 may be filled with nitrogen, all of which have different color characteristics under conditions of electrical ionization. Glow discharge electrodes are provided for each separate vessel. Electrodes 1a and 1b are disposed in vessel 1. Electrodes 2a and 2b are disposed in vessel 2. Electrodes 3a and 3b are arranged in vessel 3. Electrodes 4a and 4b are mounted in vessel 4, and electrodes 5a and 5b are disposed in vessel 5. These sets of electrodes are connected independently to the different frequency response circuits 11, 12, 13, 14 and 15, respectively. A source of light 6 may be directed through the several glow discharge cham-

One of the objects of my invention is to provide a television image reproducing apparatus by which an image may be reproduced in natural color.

Another object of my invention is to provide an arrangement of image observing apparatus in a television receiving system by which a multiplicity of light rays may be variably refracted in different color chambers for the reproduction of an image in color.

Still another object of my invention is to provide a construction of glow discharge tube for a television receiving system wherein the refractive index is proportional to the degree of illumination for effecting a reproduction of an image in natural color characteristic.

A further object of my invention is to provide a construction of television glow discharge tube having means for varying the density of various glow discharge portions of the tube in proportion to the tube density for the reproduction of an image in natural color characteristic.

My invention will be more fully understood from the specification hereinafter following by reference to the accompanying drawing, in which:

Figure 1 diagrammatically illustrates the glow discharge tube of my invention in connection with a portion of a television receiving circuit; Fig. 2 is a central vertical, longitudinal section of the glow discharge tube of my invention; Fig. 3 is a cross-sectional view through the glow discharge tube on line 3—3 of Fig. 2; Fig. 4 is a fragmentary longitudinal section of a modified form of glow discharge tube embodying my invention; and Fig. 5 is a cross-sectional view of the modified form of glow discharge tube taken on line 5—5 of Fig. 4.

The glow discharge tube of my invention is intended for use in connection with the output of a power amplifier stage in a television receiving circuit of the character set forth more fully in my application Serial

bers which are aligned one with another in such manner that the rays are intercepted by television scanning disc 7 in their passage through optical system 8 to the observing position 9.

When any one of the independent frequency response circuits are energized a glow discharge occurs in the corresponding glow discharge tube and the effects thereof are observable through the scanning disc 7 at the observing position 9. In order to concentrate the light, the glow discharge tube is formed as shown in Fig. 2 from a quartz rod 16 having a multiplicity of restricted portions along the length thereof as indicated at 17, 18, 19 and 20. The restricted portions of the quartz rod are uniformly tapered to the diameter of the quartz rod on each side thereof. Each restricted portion is enclosed by an envelope or cylindrical collar indicated at 21, 22, 23 and 24. These envelopes provide an enclosed gaseous chamber around each restricted portion of the quartz rod. The gases which are enclosed in each of these chambers have different color characteristics as explained in connection with Fig. 1.

The glow discharge electrodes terminate in diametrically opposite positions in the several chambers as represented at 1a-1b; 2a-2b; 3a-3b; and 4a-4b. These sets of electrodes are connected as explained in connection with Fig. 1 to different frequency response circuits. The rays of light which pass through the quartz tube are reflected at each of the restricted portions of the tube as designated by the optical paths indicated in Fig. 2. The rays of light strike the surface of the tube and are refracted. The refractive index is proportional to the intensity of illumination. If the illumination is large then there is not as much difference between the density of the gas and the density of the quartz. Refraction becomes greater as the illumination increases. That is the refractive index of the restricted portions of the quartz tube changes as the degree of ionization of the adjacent medium changes. If the glow is intense due to the characteristic of the transmitted signaling energy then the refractive index will be large. As the glow is reduced due to the characteristics of the signaling energy the refractive index becomes smaller.

In Fig. 3 I have shown one method of assembling the electrodes 1a and 1b with respect to the restricted portion 17 of the quartz tube 16. In order to obtain greater ionization directly adjacent the reflecting surface of the quartz rod I may provide electrodes 25 and 26 as shown in Figs. 4 and 5, which electrodes directly hug or conform to the restricted portion 17 of the quartz rod 16. In this construction the losses due to the air gap between the electrodes is reduced and greater illumination may be obtained

enabling the refractive index to be accurately controlled.

I have illustrated the television glow tube apparatus operating upon a light absorbing principle inasmuch as the light emitted from source 6 reaches the position of vision at 9 by virtue of the variable absorption effected in the different tubes. I may also use the direct vision method where the reproduction of the image depends upon the degree of illumination of the tubes.

For a further understanding of the television system of my invention reference is made to my copending applications Serial No. 299,501, filed April 14, 1928, entitled "Glow discharge device" and Serial No. 414,957, filed December 18, 1929, entitled "Television system" issued as Patent No. 1,848,324, March 8, 1932.

While I have described my invention in certain preferred embodiments I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than are imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. In a television system an optical path extending through a multiplicity of gaseous discharge chambers in succession, sets of discharge plates in each of said chambers and means for applying television signals to said sets of discharge plates for establishing a condition of ionization in one or more of said chambers along the length of said optical path.
2. In a television system a longitudinally extending optical system and a multiplicity of sets of discharge plates, each set of said plates providing ionizing paths extending normal to said optical system at spaced intervals along the length thereof and means for applying television signals to each of said sets of discharge plates for establishing ionization of differing characteristics in one or more of said chambers in succession.
3. In a television system a longitudinally extending optical path, said path being modified in optical cross-section at spaced intervals along the length thereof, a gaseous chamber surrounding said optical path at each of the positions of modified cross-section thereof, sets of electrodes extending into each of said gaseous chambers at the positions of modified cross-section for selectively producing ionization adjacent the parts of said optical path of modified cross-section individual energy supply circuits connected with each of said sets of electrodes for independently energizing said electrodes, and means for applying television signals to said energy supply circuits.
4. In a television system a rod member constituting a longitudinally extending op-

tical path, said rod being restricted in cross-section at a plurality of points at spaced intervals along the length thereof, envelopes surrounding said rod at each of the restricted portions thereof for confining a gaseous medium around the restricted portions of said rod, sets of electrodes disposed within each of said envelopes for selectively subjecting the gaseous medium to ionization therein and correspondingly changing the refractive index of the restricted portions of said rod with respect to the passage of light through the optical path formed thereby, individual energy supply circuits connected with each of said sets of electrodes for independently energizing said electrodes, and means for applying television signals to said energy supply circuits.

5. In a television system a longitudinally extending rod of transparent material, said rod having portions of restricted cross-sectional area at spaced intervals along the rod, envelopes surrounding each of the restricted portions of said rod for confining a gaseous medium around the restricted portions of said rod, a pair of electrodes disposed on diametrically opposite sides of each of the restricted portions of said rod for selectively ionizing the gaseous medium adjacent the restricted portion of said rod and modifying the refractive index at each of the restricted portions of said rod for correspondingly controlling the passage of light rays longitudinally through said rod and individual energy supply circuits connected with each pair of said electrodes for independently energizing said electrodes.

6. In a television system a longitudinally extending rod of transparent material, said rod having portions of restricted cross-sectional area at spaced intervals along the rod, envelopes surrounding each of the restricted portions of said rod for confining a gaseous medium around the restricted portions of said rod, a pair of electrodes each of semicircular cross-section and conforming with the shape of the restricted portions of said rod, said electrodes being disposed on diametrically opposite sides of the restricted portions of said rod and adapted to be variably excited for ionizing the gaseous medium adjacent the restricted portion of said rod and modifying the refractive index thereof at each of the restricted cross-sectional areas of the rod for correspondingly controlling the passage of light rays longitudinally through the rod and individual energy supply circuits connected with each pair of said electrodes for independently energizing said electrodes.

7. In a television system a longitudinally extending rod of transparent material constituting an optical path, said rod being gradually narrowed in cross-sectional area at a plurality of spaced intervals along the length thereof, an envelope surrounding each of the

narrowed portions of said rod, a gaseous medium of distinguishing color characteristics confined in the successive envelopes, sets of discharge electrodes projecting into each of said envelopes for selectively ionizing the gaseous medium within said envelopes and modifying the refractive index of said optical path adjacent the narrowed portions thereof for variably controlling the passage of light rays longitudinally through said optical path and energy supply circuits individual to each of said sets of discharge electrodes for independently energizing said electrodes.

In testimony whereof I affix my signature.

CHESTER L. DAVIS.