Oct. 25, 1932. C. L. DAVIS 1,884,593

TELEVISION SYSTEM

Filed July 23, 1930 2 Sheets-Sheet 1

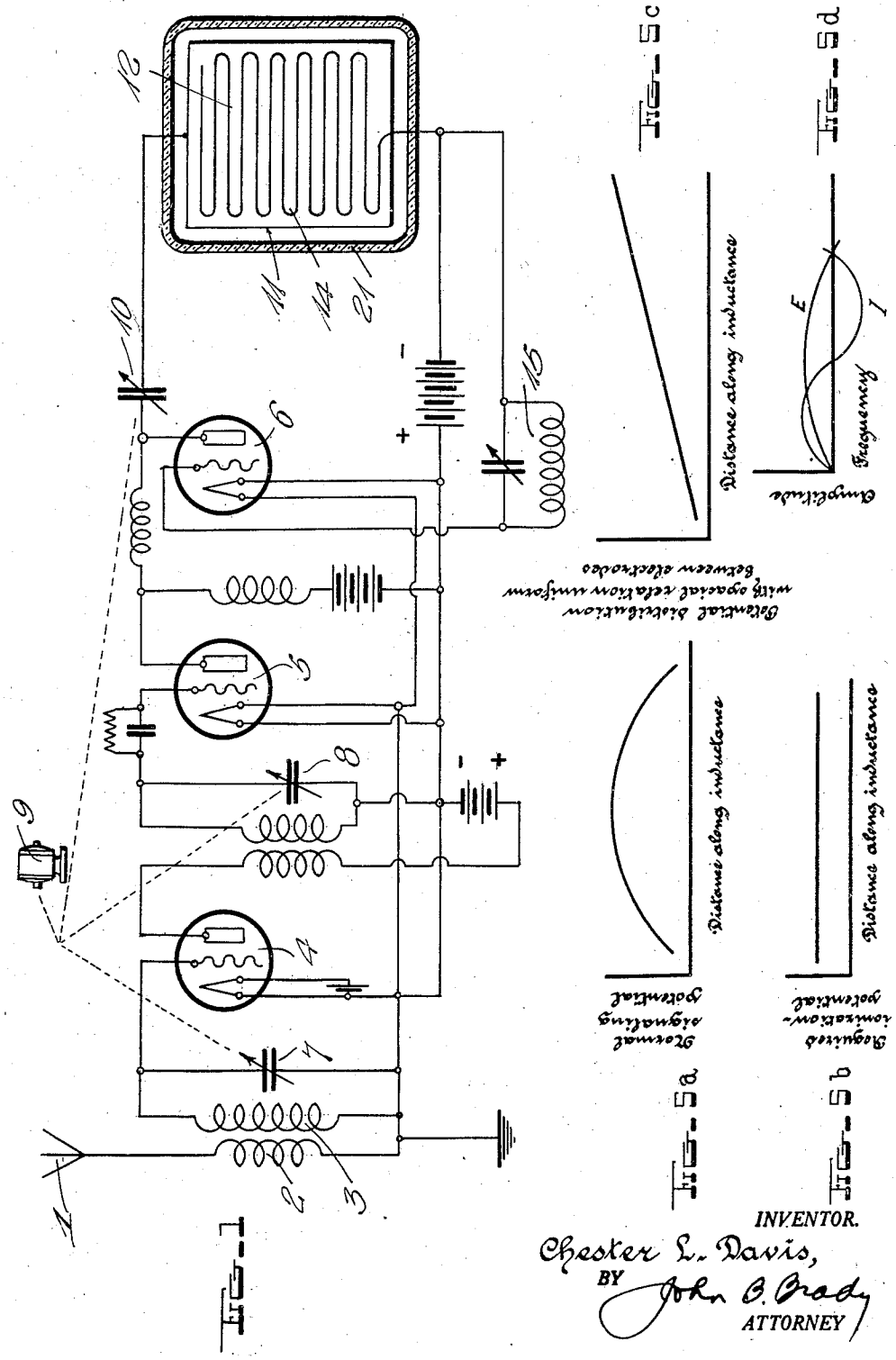


Fig. 1

Fig. 5c Fig. 5d

Distance along inductance

Distance along inductance

Fig. 5a Fig. 5b

INVENTOR.

Chester L. Davis,

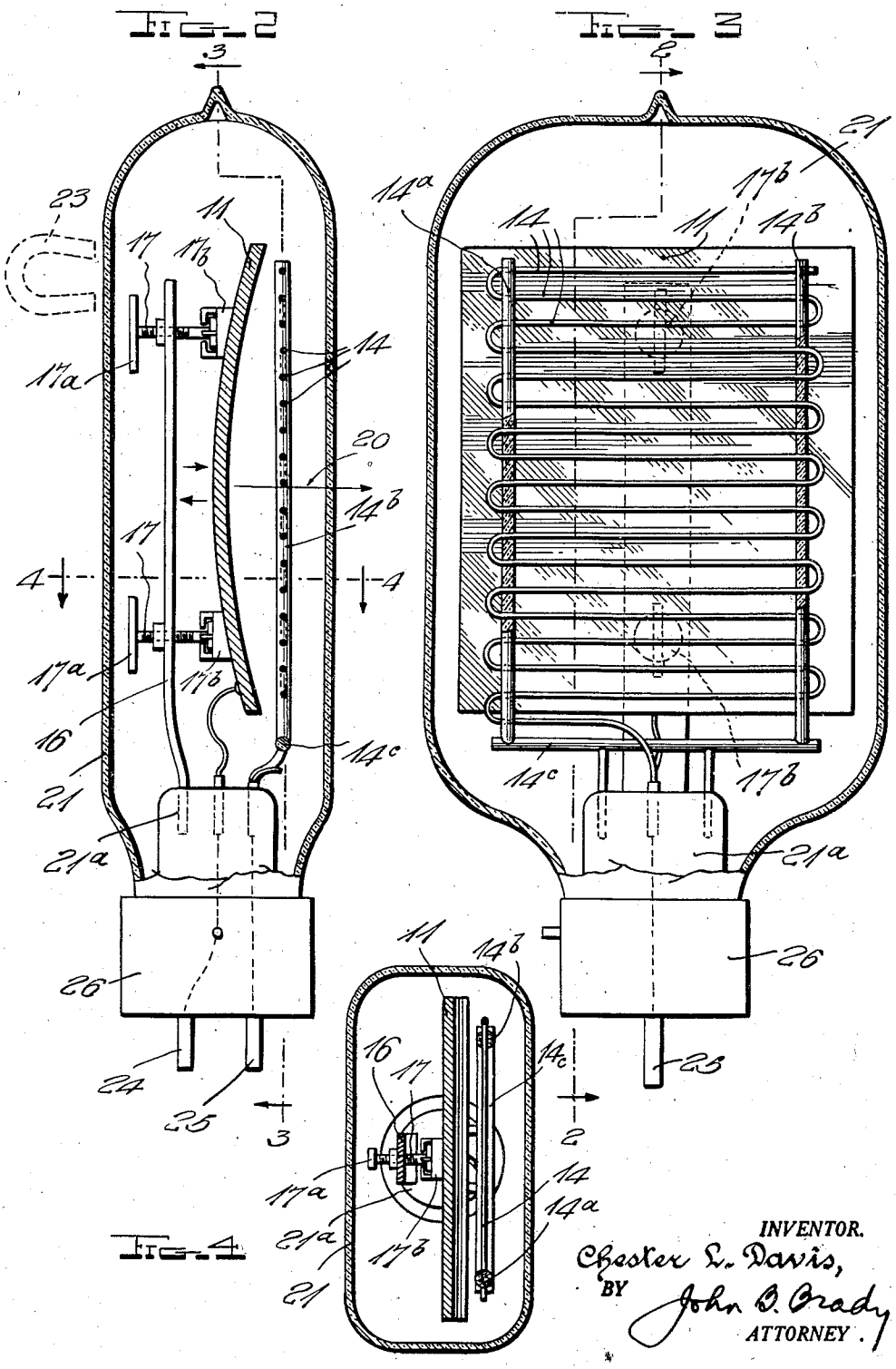
BY John B. Brady

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Oct. 25, 1932. C. L. DAVIS 1,884,593

TELEVISION SYSTEM

Filed July 23, 1930 2 Sheets-Sheet 2



Patented Oct. 25, 1932 1,884,593

UNITED STATES PATENT OFFICE

CHESTER L. DAVIS, OF KEOKUK, IOWA, ASSIGNOR TO WIRED RADIO, INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

TELEVISION SYSTEM

Application filed July 23, 1930. Serial No. 470,157.

My invention relates broadly to television systems and more particularly to a construction of image reproducing screen.

One of the objects of my invention is to provide an arrangement of image reproducing screen for television systems in which a glow discharge takes place across a variable capacity gap in accordance with the variation in the position of a potential node in a television receiving circuit.

Another object of my invention is to provide a construction of television screen for connection in a television receiving circuit wherein the screen comprises an inductance element and a plate member variably and spacially related with respect thereto for the luminous discharge of high frequency electrical energy between the inductive screen and the plate member which is associated therewith.

Still another object of my invention is to provide a construction of image reproducing screen for television systems wherein a concave plate member is disposed adjacent an inductance member and serves as an adjustable capacity unit and reflector for rays of light occurring from luminous discharge between said inductive screen and said plate member.

Other and further objects of my invention reside in an arrangement of luminous discharge screen for television receiving systems as set forth more fully in the specification hereinafter following by reference to the accompanying drawings, in which:

Figure 1 diagrammatically illustrates a television receiving circuit to the output of which the image reproducing screen of my invention is electrically connected; Fig. 2 is a cross-sectional view through the image reproducing screen of my invention mounted in a socket engaging base taken on line 2—2 of Fig. 3; Fig. 3 is a vertical longitudinal sectional view of the image reproducing screen taken on line 3—3 of Fig. 2; Fig. 4 is a lateral cross-sectional view on line 4—4 of Fig. 2; and Figs. 5*a*, 5*b*, 5*c* and 5*d* illustrate a series of characteristic curves of the image reproducing screen embodying the principles of my invention.

The image reproducing screen of my invention is employed in television systems of the character described in my Letters Patent No. 1,756,086, dated April 29, 1930, entitled "Signaling system", and Letters Patent 1,789,219, dated January 13, 1931, entitled "Glow discharge device" and application Serial No. 414,957, filed December 18, 1929, entitled "Television system." For a further understanding of the television system of my invention reference is made to my copending application Serial No. 460,760, filed June 12, 1930, entitled "Television system."

Referring to the drawings in detail, reference character 1 designates an antenna system connected to primary winding 2 of a coupling transformer having a secondary winding 3 tuned by variable condenser 7 and connected to the radio frequency amplifier designated at 4. A detector is indicated at 5 coupled through tuned circuit 8 with the output of radio frequency amplifier 4. An oscillator 6 is coupled to detector 5 and has the television image reproducing screen 12 connected thereto as shown. The screen comprises a pair of electrodes designated at 11 and 14 disposed within a vessel 21. One of the electrodes shown at 11 consists of a concave plate member which is capacitively related to the inductance element 14. The electrode 11 is concave in shape and serves as a reflector for the luminous discharge which takes place between the turns of the electrode 14 and the surface of the plate 11. The turns of inductance 11 are supported by insulated transparent rods 14*a* and 14*b* carried by laterally extending member 14*c* mounted in the glass press 21*a* of tube 21. The spacial relation of the plate 11 with the conductor 14 is varied by movement of screw members 17 suitably supported within the vessel 21 on member 16 and terminating in rotatable jaw guides 17*b* on the rear of the concave plate member 11. Member 16 is supported in the glass press 21*a* of tube 21 as indicated.

Magnetic members 17*a* are secured to the rotatable screw members 17 and are adjustable exteriorly of the vessel 21 to accurately position the plate member 11 with respect to the inductive screen 14 by following the

magnetic member 17*a* by means of a bar magnet indicated at 23 which is moved in a spiral path outside the vessel 21 whereby the plate 11 may be advanced or retracted to a selected position with respect to the turns of inductance 14. The terminals of the screen are brought out through suitably spaced insulated tubes to contacts 24 and 25 in the base 26 by which the image reproducing screen may be mounted in a suitable socket.

The series of curves shown at Fig. 5*a*, Fig. 5*b*, Fig. 5*c* and Fig. 5*d* show the different characteristics of the glow discharge tube of my invention. The electrodes of the glow discharge tube connect in circuit with the high frequency oscillator and are subject to a continuous luminous discharge by oscillations which are sustained in the circuit 10—11—14—15 of the oscillator shown in Fig. 1. The driving motor 9 periodically varies the tuning of condensers 7—8—10 at a rate proportional to changes in frequency of the transmitted signaling energy. As illustrated in Fig. 5*a* the normal signaling potential varies along the inductance screen 14 according to the curve C. Fig. 5*b* represents the required ionization potential for the variably spaced reflector and inductance. In order to secure uniform illumination of the screen, the characteristic shown in 5*b* should be maintained according to curve B. In Fig. 4*c* the effect of uniformly spacing the electrodes is shown where the potential distribution is non-uniform and which will produce non-uniform illumination along the conductor irrespective of the modulated energy. Obviously this is an undesired condition and is remedied by the arrangement which I employ.

Due to the fact that the potential of the antinodes of the circulating current along the turns of the inductance 14 rapidly decreases as the circuit of the glow discharge tube recedes from resonance condition with respect to the exciting source, higher potential is required to cause discharge of light luminous intensity at the points where such potential decreases. This provides uniform response irrespective of forced conditions. In Fig. 5*d* I have shown the distribution of voltage and current along the electrode 14. The resonant point is indicated by the maximum voltage condition at point K, that is where the circuit has a frequency characteristic resonant to the exciting source. The adjustments of the circuit are such that uniform intensity of glow discharge is obtained even though the circuit is not being modulated. Under conditions of modulation the node extends from one position to another along the turns of the inductance 14 and all of these moving potential nodes are integrated in forming an image of the distant object.

The structure of the television screen will be clearly understood from Figs. 2, 3 and 4 wherein the envelope 21 encloses the inductive electrode 14 and the concave mirror electrode 11 in such position that reflection of the reproduced image takes place along the axis 20 normal to a tangential line drawn with respect to the concave surface of the mirror 11. By reason of the arrangement of the electrodes 11 and 14 within the discharge envelope 21 it is possible to readily withdraw the screen from the output circuit by removing the tube from a suitable supporting socket and replacing the same by a renewal tube. For certain classes of television work it may be desirable to use tubes of different color characteristics so that the removal of the tube and replacement of a substitute tube may be made readily. The envelope of the tube may be filled with such gases as neon, krypton, nitrogen, etc., having different color characteristics for producing different characteristics of glow as may be desired. The structure of the image reproducing screen is such as to insure sharpness in vision of the reproduced image.

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. A television glow discharge screen comprising an inductance member having the turns thereof disposed parallel one to another and a reflective plate of conductive material variably adjustable adjacent said inductance member, said plate having a concave surface immediately adjacent said inductance member.

2. A television glow discharge tube comprising an inductive member and a reflective plate member adjustably positioned with respect thereto and means for shifting said plate member to selected capacitative positions with respect to said inductive member.

3. A television screen comprising an inductive member and a plate member, said inductive member including a multiplicity of parallel extending turns extending laterally with respect to said plate member, an envelope enclosing said members and means for shifting said plate member with respect to said inductive member.

4. A television screen member comprising an inductive member and a concave plate, members positioned adjacent thereto, an envelope enclosing said members in an ionizing atmosphere and means for adjusting said concave plate to differing capacitative positions with respect to said inductive member.

5. A television image reproducing screen comprising a gaseous discharge envelope, a pair of electrodes disposed therein, one of said

electrodes comprising an inductive member having a multiplicity of parallel disposed turns located in the same plane, and the other of said electrodes comprising a concave plate member adjustably mounted adjacent said inductive member with the turns of said inductive member disposed at different distances from said concave plate member.

6. A television image reproducing screen comprising a tube having a base, contacts extending from said base, a press within said tube and means extending from said press comprising a conductive member bent upon itself with parts of the member extending in the same plane and an adjacent member substantially in the form of a concave conductive mirror adjustably positioned behind said concave member, and connections between said conductive member and said conductive mirror with said contacts.

7. A television image reproducing screen comprising a tubular envelope, a supporting base carrying said envelope, a press connected with said base, an inductance element supported by said press with the turns thereof disposed in the same vertical plane, and a conductive mirror supported by said press in a position adjacent said inductance element, and means for adjusting the spacial relation between said conductive mirror and said inductance element.

8. A television image reproducing screen comprising an evacuated envelope, a base secured to said enevelope, a press connected with said base, a pair of electrodes supported by said press, one of said electrodes comprising a conductive member bent in the form of an inductance with the turns thereof disposed in the same vertical plane and the other of said electrodes comprising concave conductive mirror disposed adjacent said first mentioned electrodes, and means for adjustably positioning said concave conductive mirror in different glow discharge positions with respect to turns of said inductance.

In testimony whereof I affix my signature.

CHESTER L. DAVIS.