Feb. 22, 1938. J. GETTINGER 2,108,852

TELEVISION APPARATUS

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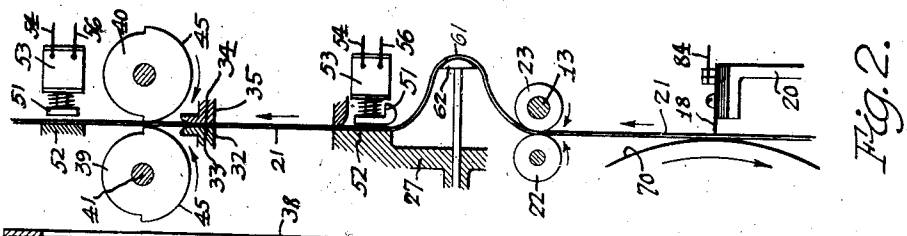


Fig. 2.

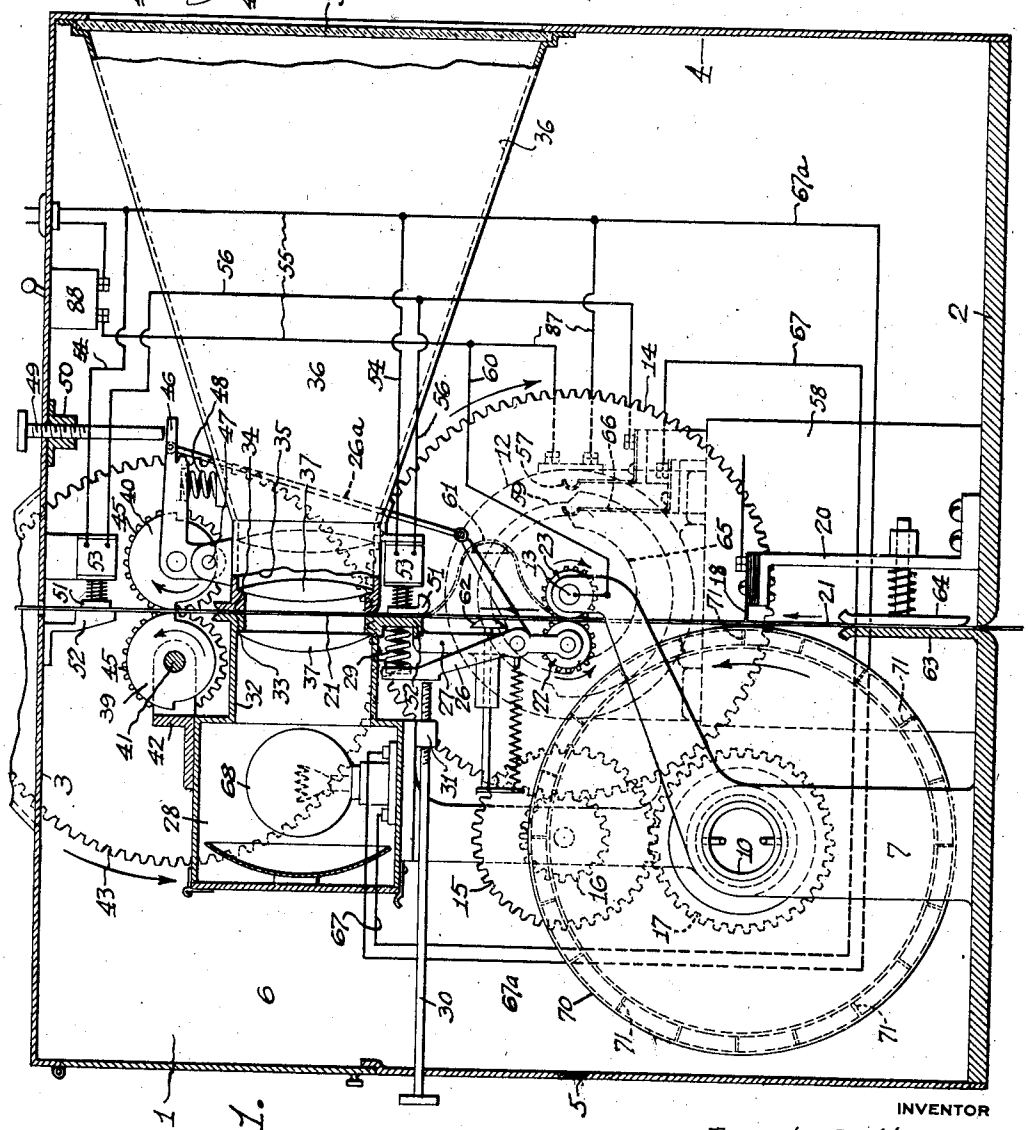


Fig. 1.

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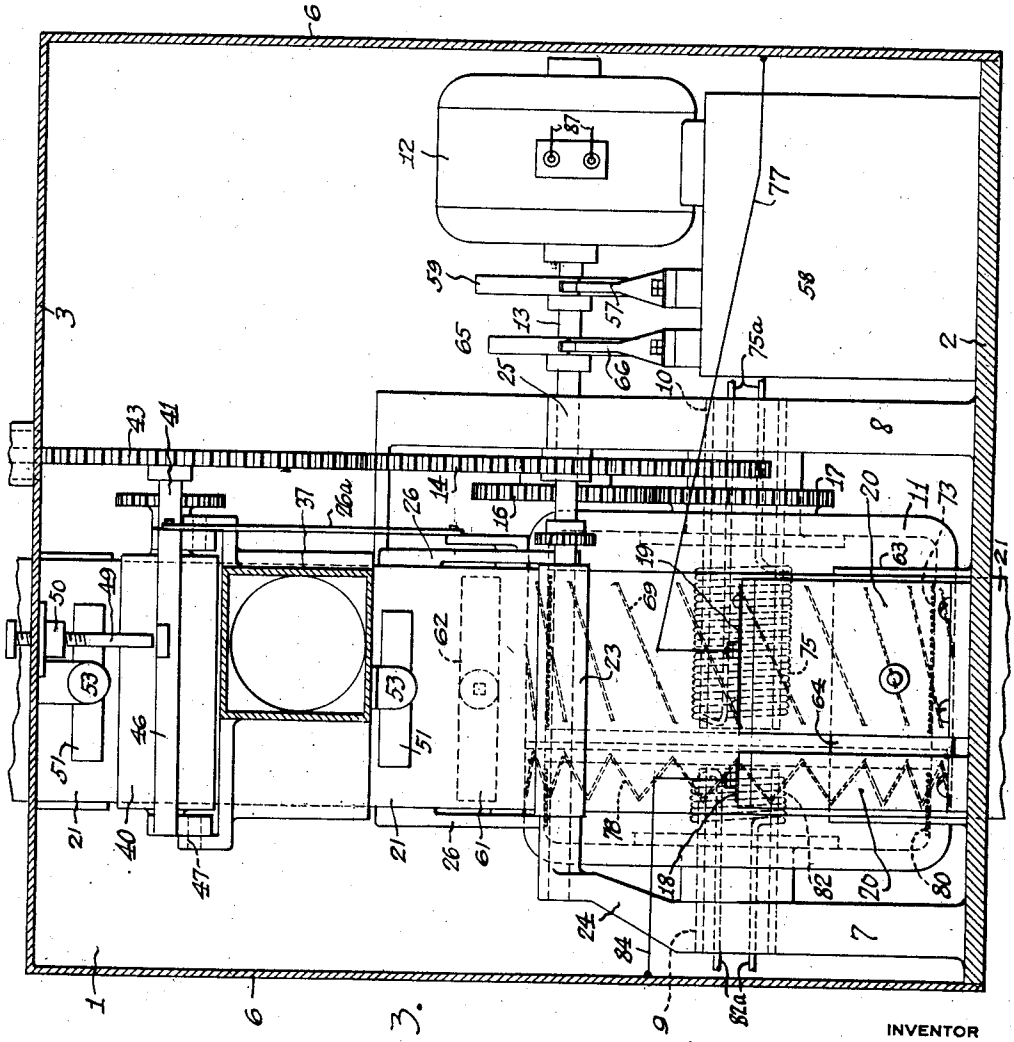


Fig. 3.

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Filed April 27, 1934 3 Sheets-Sheet 3

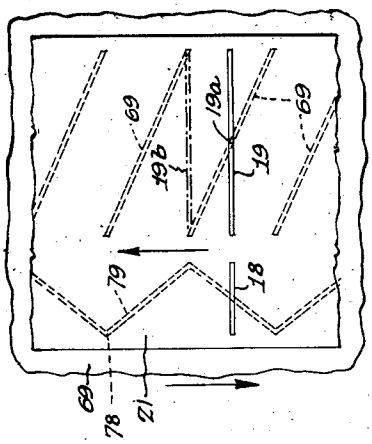


Fig. 5.

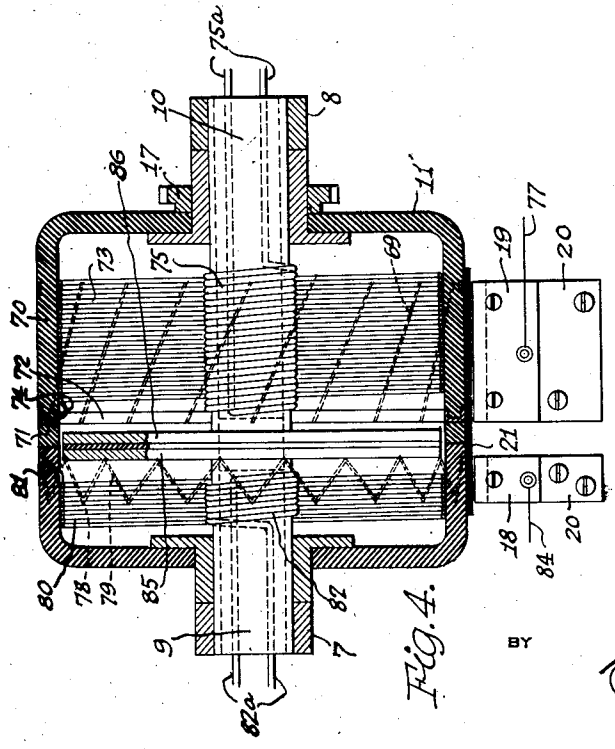


Fig. 4.

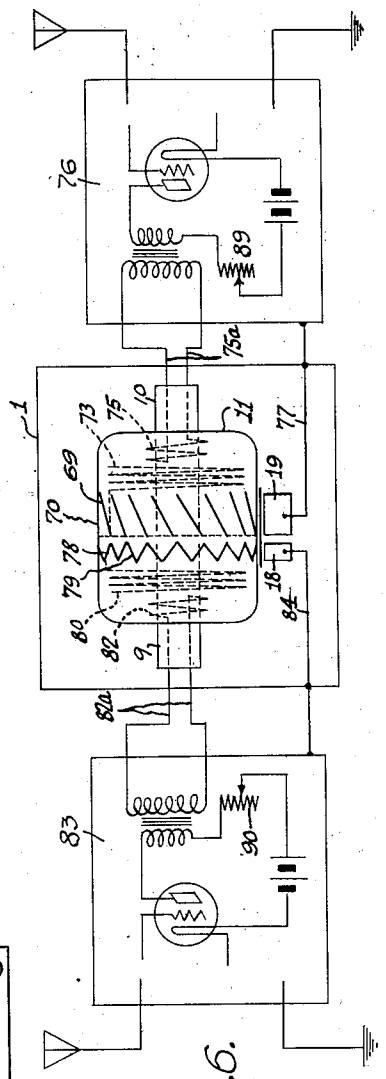


Fig. 6.

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Patented Feb. 22, 1938

2,108,852

UNITED STATES PATENT OFFICE

2,108,852

TELEVISION APPARATUS

Joseph Gettinger, Chicago, Ill.

Application April 27, 1934, Serial No. 722,664

12 Claims. (Cl. 178—5.6)

The present invention relates to a novel television receiver and motion picture projector adapted to receive and record high frequency electrical impulses representing the elements of an image originating at a television transmitter and converting said impulses into a similar image upon a color impregnated hygroscopic film at the receiver for immediate projection within a fraction of a second upon a screen. This application is a continuation in part of my application filed June 16, 1932, Serial No. 617,549.

The principal object of this invention is to record such image impulses progressively on a continuously moving color impregnated hygroscopic film for the instantaneous and fully developed production of a complete image thereon and simultaneously expose within a fraction of a second a previously recorded image portion of said film intermittently in a motion picture projector.

Another object is to record the effect of the received impulses upon such color impregnated hygroscopic but basically transparent film by means of a high frequency electrical discharge through the film, the nature of the film being such as to react to these discharges in a definite manner and in accordance with the impulses received from a television transmitter.

Another object is to produce in such a film, by means of a high frequency electrical discharge, an instantaneous and fully developed permanent record of the image of the received impulses, said impulses representing and corresponding to the varying light intensities produced at the transmitter, the elements of which constitute the complete image or picture.

Still another object is to provide a novel scanning means whereby the received image impulses are converted into high frequency electrical discharges and are passed through such a specially prepared, but also conductive film to form a series of instantaneously and fully developed contiguous transverse lines upon such a continuously moving film, the number of such lines being dependent upon the dimensions of the electrical discharge and particular arrangement of the scanning means.

Another object of importance is to transfer the high or ultra-high frequency impulses from the receiving instrument proper, to the scanning means in such a manner as to have no distortion of the impulses occurring. This is accomplished by the use of high frequency coils concentrically arranged within the scanning means.

Still another object of the invention is to produce instantaneously and fully developed a concurrent sound and image record upon the same film whereby the instantaneous and fully developed sound record is produced synchronously with the picture record.

Another object is to provide a novel means for moving and arresting the film alternately through a picture film projector together with means for extinguishing and relighting the projector lamp thereof thus obviating the use of shutters during the shifting of the film. These means are electrically synchronized with and controlled by mechanism associated with the continuously moving portion of the film.

Still another object is to provide means for manually releasing the film driving mechanism to effect the framing of the picture film at the projector for its proper focusing on the screen.

The invention is more fully disclosed by way of example in the following description and in the accompanying drawings in which—

Figure 1 is a longitudinal section through the television receiver and projector;

Fig. 2 is a fragmentary view showing an alternate position of the film moving mechanism and scanning mechanism;

Fig. 3 is a transverse view through the television receiver on line 3—3 of Fig. 1;

Fig. 4 is a detail cross section through the scanning drum on line 4—4 of Fig. 3;

Fig. 5 is a schematic view showing the method of scanning the film; and

Fig. 6 is a wiring diagram showing the sound and television receivers and associated scanning mechanism.

In Figure 1 the television receiver comprises a casing 1 having a base 2, a top 3, front and rear walls 4 and 5, and side walls 6. Extending from the base 2 are spaced apart supports 7 and 8 to which are secured aligned hollow bearing members 9 and 10 respectively.

A scanning drum 11 rotates upon the bearing members 9 and 10, said drum being driven by an electric motor 12 having a driving shaft 13. Gears 14, 15, 16 and 17 connect the motor shaft 13 with the scanning drum 11.

Electrodes 18 and 19 are separately mounted on supports 20 and insulated therefrom. These electrodes consist of thin flat plates and lie in a horizontal plane passing through the axis of the drum 11. A color impregnated hygroscopic, but also conductive film 21 is adapted to pass between the surface of the drum 11 and the edge of the electrodes 18 and 19. This film is basically of a transparent character and is conductive to electrical high frequency discharges passing be-

tween the drum 11 and electrodes 18 and 19. The film is characterized as stated by being impregnated with a hygroscopic medium such as glycerine or any other hygroscopic medium, thereby making the film conductive and having incorporated therewith a color or dye substance susceptible to change instantaneously and develop fully upon the passage of a high frequency electrical discharge therethrough.

More specifically this film is composed of a material of an absorbent character. Such material may consist of cellulose similar to the ordinary celluloid film or a product made from regenerated cellulose. This film is impregnated as stated with a hygroscopic medium, which, owing to its hygroscopic properties, induces therein atmospheric moisture, which by its combination with carbon renders such combination conductive to an electric discharge therethrough of a predetermined voltage and current. Furthermore, it will be observed that inasmuch as many hygroscopic mediums have within their atomic structures hydrogen or oxygen ions or both or hydroxyl ions, it will be readily understood why such a combination becomes conductive to an electric current, and it will also be noted that hygroscopic mediums containing such ions are very stable in retaining atmospheric moisture. It will also be readily understood that the proportionate incorporation of such hygroscopic mediums will be the responsible factor for the conductivity of the film. It will be obvious from the foregoing that it is possible to adjust the resistance value of the film to the electric current. Incorporated with a hygroscopic medium are certain dye or coloring substances, normally opaque to light.

The electrical discharge through said medium results in a thermal and oxidizing action upon said coloring matter and having a varied bleaching effect thereon which alters the chemical and physical structure of both the hygroscopic medium and the dye or coloring matter in accordance with varying intensity of the discharge, which is determined by the intensity of light impinging on the photo-electric tube, and, as stated above, the degree of bleaching is dependent upon the varying intensity of the electrical discharge and the consequent thermal and oxidizing effect. The hygroscopic medium and dye or coloring substance are such as to provide a high resistance, which permits the use of higher voltage and low current flow in order that each electric discharge therethrough shall only effect a minute portion of the film at any one instant. The value of this resistance is such as to develop a varying quantity of thermal action, which is proportionate to the varying intensity of the electric discharge which effects a chemical change in the hygroscopic medium whereby acids of high order are produced in varying amounts instantaneously. The reaction of the acids upon the dye or coloring substances together with the effect of the ozone produced by the electric discharge and its intense oxidizing property effects both the hygroscopic medium and dye or coloring substance causing a permanent change therein. The temperature and heat developed by the electric discharge is of instant duration and of high frequency and said heat is wholly absorbed in the chemical reaction. Thus the material of the film itself and its inherent transparency remains unchanged. This bleaching action has the effect of producing continuous variation in the transparency of said coloring matter. Successive movements of said electrical discharge across said film causes a blending of the contiguous paths traced across said film whereby the so-called line effect ordinarily present in light scanning is hereby eliminated.

The film 21 is continuously driven by its passage between a pair of geared rolls 22 and 23. The roll 23 is secured to and driven by an extension of the motor shaft 13. This shaft is journalled in bearings 24 and 25 which are extensions of the supports 7 and 8 respectively.

The roll 22 is rotatably mounted in yoke 26 pivoted to a bracket 27 secured to a lamp housing 28. A spring 29 is interposed between the bracket 27 and the yoke 26 which normally acts to grip the film between the rolls 22 and 23 whereby sufficient frictional resistance is had to propel the film 21 by said rolls. Manually operable means 30 threaded through an extension 31 of the lamp housing 28 is adapted to release the tension roll 20 whereby the film may be freely moved between the rolls and whereby said film may be adjusted to adequately frame the film in the projector.

The housing 28 is provided with a reduced apertured portion 32 having a face 33. A similar confronting face 34 forms part of a housing 35, the side walls 36 of which are divergent, said walls being extended forwardly and secured to the front wall 4 of the casing 1.

An optical system indicated as at 37 is secured within the housings 28 and 35 whereby the film image is projected and properly focused for visualization upon a translucent screen 38 secured to the front wall 4 of the casing 1.

The film 21 passes between the faces 33 and 34 for intermittent movement such movement being effected by a pair of geared cylindrical cams 39 and 40. The cam 39 is secured to a shaft 41 having bearing in a bracket 42 secured to the housing 28. Another gear 43 is secured to the shaft 41 and meshes with the gear 14 on the motor shaft 13. These gears are of equal diameter and hence the shafts 43 and 41 rotate at the same speed. High portions 45 of said cams are adapted to engage opposite sides of the film 21. The cam 40 is rotatable in a yoke 46 and is pivoted on the housing 35 as at 47. A spring 48 normally acts to grip the film 21 between the cams 39 and 40 whereby sufficient frictional resistance is had to propel the film.

Manually operable means 49 threaded through a nut 50 secured to the top wall 3 provides means for releasing the tensioned cam 40 whereby the film may be freely moved between the cams.

The yokes 26 and 46 are connected by a link 26a in a manner whereby the roll 22 and cam 39 can be released simultaneously from contact with the film 21 by manipulation of either of the manually operable means 30 or 49.

The half circumference of the high portion of each of the cams 39 and 40 is equal to the circumference of the roll 23. The half circumference of each cam is also equal to the length of a unit picture, hence at each alternate half revolution of the cams 39 and 40 the film is propelled upwardly to bring a new unit picture within the framing of the lens system 37. Conversely the low portions of the cams 39 and 40 at each alternate half revolution are out of contact with the film and hence the film remains at rest. In this position the film is held against movement by spring pressed plungers 51 which frictionally hold the film against stops 52. These plungers are actuated by solenoids 53 one terminal of each

being connected by a conductor 64 to one side of a power circuit 65. Each of the other terminals of the solenoids are connected by a conductor 66 to switch a contactor 67 mounted on the motor base 68. A contact cam 69 is rotatable with the motor shaft 13 and contacts during one half of a revolution with the contactor 67. A conductor 60 grounds the cam 69 through the shaft 13 to the other side of the power circuit. The closing of this circuit retracts the plungers of the solenoids 53 thus permitting the free movement of the film by the cams 39 and 40 as clearly indicated in Fig. 2. The foregoing devices constitute means for intermittently moving the film through the projector.

It will be observed that while a portion of the film 21 is held at rest as shown in Fig. 1, another portion of said film indicated at 61 is being fed upwardly by the rolls 22 and 23, said portion of the film being moved laterally by a spring pressed member 62 to compensate for the lengthening out of the film between the lower plunger 51 and the feed rolls 22 and 23 as shown in Fig. 2. The member 62 is of a length substantially equal to the width of the film 21 and its contact therewith maintains said film against lateral distortion. The lengthening of the film is again taken up or shortened when the film is initially being fed upwardly by the cam rolls 39 and 40 as shown in Fig. 2. Thus while the upper portion of the film is intermittently exposed in the projector of the lower portion of the said film upon which the image is being instantaneously and fully developed is being continuously fed between the scanning drum 11 and the electrodes 18 and 19. A guide 63 and tension member 64 provides means for maintaining the film taut and out of contact with the scanning drum surface and the edge of the electrodes 18 and 19.

Another contact cam 65 is secured on the motor shaft 13, adjacent the contact cam 59, and is adapted to contact with a contactor 66 mounted on the motor base 58. Said contactor is connected by conductor 67 to a projection lamp 68 within the lamp housing 28. Another conductor 67a from said lamp connects with one side of the power circuit 55. The contact cam 65 is grounded to the other side of the power circuit by the conductor 60 in a manner similar to the contact cam 59.

The contacting of the cam 65 and contactor 64 closes the circuit to the lamp 68 which remains illuminated during a half revolution of said cams and during the rest period of the film 21. Conversely during a subsequent half revolution of said cam the lamp will be extinguished. Simultaneously with the last mentioned movement of the cam 65, the plungers 51 are retracted to permit of the shifting of the film by the cams 39 and 40.

As hereinbefore mentioned one of the objects of this invention is to produce instantaneous and fully developed concurrent sound and image records upon the same film by means of a high frequency electrical discharge conducted through a color impregnated hygroscopic film. The passage of this electrical discharge instantly conditions the film, for its immediate use within a fraction of a second in the projector, in accordance with the received electrical impulses which correspond to the varying light intensities of the image and accompanying sound variations originating at the transmitter.

To accomplish this end the scanning drum 11 is provided with equally spaced conductors 69 flush with the surface of a cylindrical wall 70 of said drum. These conductors are angularly disposed relative to the axis of said drum. One end of each conductor is connected by a connector 71 to a ring 72 secured to the inner surface of the drum. A secondary coil 73 is secured to the inner surface of the cylindrical wall 70, said coil being grounded on the ring 72 as at 74.

A fixed primary coil 75, concentric with the secondary coil 73, is wound on the bearing member 10 and insulated therefrom. The terminals 75a of this coil are adapted to receive electrical impulses from a radio television receiver 76 as shown in Fig. 6. These impulses are transmitted to and received by the secondary coil 73, by induction, from the primary coil 75, and thence to the conductors 69 from whence an electrical discharge of high frequency is conducted through the film 21 to the electrode 19, and thence by a conductor 77 grounded on the casing 1 and connected to the chassis of the television radio receiver 76. These devices just described constitute the means for instantaneously and fully developing and recording the picture elements on a portion of the film in accordance with the received electrical impulses originating at the transmitter.

Adjacent the conductors 69 on the drum 11 is another conductor 78 flush with the surface of said drum. This conductor comprises angularly disposed connected members 79 of zig-zag formation forming a continuous conductor. A secondary coil 80 is secured to the inner surface of the cylindrical wall 70, one end of said coil being grounded on the conductor 78 as at 81.

A fixed primary coil 82, concentric with the coil 80, is wound on the bearing member 9 and insulated therefrom. The terminals 82a of this coil are adapted to receive electrical impulses of high frequency, from a radio receiver 83 as shown in Fig. 6. These impulses are transmitted to and received by the secondary coil 80, by induction, and thence conducted to the zig-zag conductor 78 from whence a high frequency electrical discharge is conducted through the film 21 to the electrode 18, it being grounded by a conductor 84 to the casing 1 and to the chassis of the radio receiver 83.

It is to be noted that the concentric arrangement of these coils requires no physical connections between coils, said coils and their position constituting a transfer point for the high or ultra-high frequency impulses without distortion. This arrangement eliminates commutator distributor arrangement. A commutator distributor arrangement used as a transfer point creates distortion of the high or ultra-high impulses due to frictional conditions set up between commutator and its brush contactor and consequent thermal action, which always constitutes an interposed unbalanced resistance to a high frequency electric current. Any such interposed resistance will always result in a lagging of the high or ultra-high frequencies and therefore brings about distorted sequences. Still further, with the presence of high frequency electric current, a thermal action which is caused by the resistance of the conductors will release a certain amount of electro-thermal action, which, is very detrimental to the transferring of high or ultra-high frequencies.

The zig-zag formation of the conductor 78 provides a greater circumferential length than is possible with a straight band track, therefore a greater number of impulse variations can be re-

corded upon the film during one revolution of the drum.

These devices just described constitute means for instantaneously and fully developing and recording of the sound variations on the film 21, adjacent the picture record, thereby forming a sound track thereon in accordance with electrical impulses originating at the transmitter.

Fixed insulated non-magnetic plates 85 and 86 are supported adjacent each other on the ends of the bearing members 9 and 10 within the drum 11. These plates form an electrostatic shield between the primary coils 75 and 82, and secondary coils 73 and 80, said shield being adapted to prevent electrical interference between said coils.

The relative speeds of the scanning drum 11 and film feed rolls 22 and 23 is such as to produce upon the film the desired number of lines per unit length of picture, as for example, a picture length approximating one inch comprises one hundred lines per inch. To produce this number of lines the scanning drum 11 is provided with twenty conductors with the drum revolving at a speed five times that of the feed rolls 22 and 23, therefore, one hundred conductors pass the electrodes while the film is moved a unit length between the drum and electrodes.

It is highly desirable to produce a picture upon the film with as many picture elements as possible in order to improve the texture and produce a finer grained picture. To accomplish this it will be very readily understood by the following explanation that this invention permits the scanning and composition of a picture with as many as 400 lines or more to a picture. By constructing the scanning drum with 80 diagonal scanning bars, spaced ¼ of an inch apart, which will give a circumference of 20 inches and a diameter of 6⅓ inches. This drum revolving at 4800 R. P. M. will result in sixteen pictures per second with 400 lines to a picture. Furthermore this construction permits the dimensions of the television receiver to be about ten inches in size overall. Now, to take in consideration the same demand on a Nipkow disc scanner it will be seen that such a demand would result in an impracticable construction because of the large circumference of 400 inches (one inch distance required for a standard film picture and therefore 400 scanning elements) and its corresponding diameter of 127⅓ inches. A television receiver with such a Nipkow disc scanner would require a structure of about 12 feet in height and width to accomplish scanning a picture of 400 lines, which would be practically impossible as mentioned heretofore—without taking into consideration the necessary requirements of operating such a television receiver.

Due to the angular disposition of the conductors 69 relative to the electrode 19 a point of intersection is obtained, indicated in Fig. 5 at 19a, where a minimum distance exists between said conductor and electrode, thus confining the path for an electrical discharge with a given area or spot. The maximum dimension of this spot is determined by the thickness of the conductors 69 and electrode 19.

Referring to the scanning drum 11, the opposite ends of adjacent conductors 69 lie in a plane parallel to the axis of said drum. The electrode 19 spans the ends of said conductors simultaneously as clearly shown by the dash and dotted line 19b, Fig. 5, so that these conductors form with the electrode an unbroken path for an electrical discharge passing between said conductors and electrode.

From an inspection of Figs. 1 and 5 it will be observed that the relative motions of the film 21 and conductors 69 move in opposite directions so that the spot or point of electrical discharge passing through the film from the conductor 69 to the electrode 19 moves transverse of the film from right to left. This spot traverses the film once for each conductor passing the electrode. In this manner successive contiguous lines are recorded upon the moving film in accordance with the intensity of the discharge through the film. These electrical discharges do instantaneously and fully develop and permanently alter the chemical and physical characters of the film, thereby changing the transparency thereof to correspond to the light and shade effects of the image or picture impulses originating at the television transmitter.

The sound track portion 21a, of the film 21, is instantaneously and fully developed by the passage of an electrical discharge conducted through the film from the zig-zag conductor 78 to the electrode 18 whereby the transparency is changed in the same manner as cited above for the picture film except that varying degrees of transparency thereof corresponds to sound variations originating at the television transmitter.

It is to be understood that the received impulses may be transmitted from any form of television transmitter of which the picture elements and sound impulses, number of lines and mode of scanning is such as to be adaptable to the recording method and devices herein described.

The electric motor 12 is connected to the power source 55 by conductors 87, said power source being controlled by switch 88.

The last stages of the sound and television receivers, shown in Fig. 6, are equipped with output regulators 89 and 90 by which the input to the primary coils 75 and 82 of the scanning drum 11 may be adjusted.

Although specific embodiments of the invention have been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention, as indicated by the appended claims.

What I claim is:

1. A television receiver comprising means for receiving and recording current impulses from a television transmitter, a moving film for recording said current impulses, a scanning drum, a continuous conductor and spaced conductors on said drum, electrodes adjacent said drum, radio receivers for receiving sound and picture impulses, high frequency means inductively in circuit with said radio receivers and said continuous conductor and spaced conductors for passing an electrical discharge between said conductors and electrodes and through said film.

2. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a scanning drum, spaced conductors and a continuous conductor on said drum, electrodes adjacent said spaced conductors and said continuous conductors respectively adapted to pass varying current impulses therebetween, a moving film adapted to pass between said conductors and said electrodes for recording the effect of said varying current impulses, secondary coils connected to said spaced conductors and said continuous conductor respectively, pri-

mary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils.

3. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a scanning drum, spaced conductors and a continuous conductor on said drum, electrodes adjacent said spaced conductors and said continuous conductor respectively, a moving film adapted to pass between said conductors and said electrodes for recording the effect of said varying current impulses, secondary coils connected to said spaced conductors and said continuous conductor respectively, primary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils, whereby said received current impulses are converted into high frequency currents adapted to pass between said conductors and said electrodes.

4. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a scanning drum, spaced conductors and a continuous conductor on said drum, electrodes adjacent said spaced conductors and said continuous conductor respectively, a continuously moving transparent color sensitive film adapted to pass between said conductors and said electrodes for recording the effect of said varying current impulses, secondary coils connected to said spaced conductors and said continuous conductor respectively, primary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils whereby said received current impulses are converted into high frequency currents adapted to pass between said conductors and said electrodes.

5. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a scanning drum, spaced conductors and a continuous conductor on said drum, electrodes adjacent said spaced conductors and said continuous conductor respectively, a continuously moving transparent color sensitive film adapted to pass between said conductors and said electrodes, secondary coils connected to said spaced conductors and said continuous conductor respectively, primary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils whereby said received current impulses are converted into high frequency currents adapted to pass between said conductors and said electrodes, to alter the color sensitive film in accordance with said received varying television and sound current impulses.

6. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a rotating drum, angularly spaced conductors and a continuous zig-zag conductor on said drum, horizontally disposed electrodes adjacent said spaced conductors and said zig-zag conductor respectively, one of said electrodes being adapted to span the opposite ends of adjacent angular conductors and the other electrode being adapted to span the zig-zag conductor, a continuous moving film adapted to pass between said conductors and said electrodes for recording the effect of said varying current impulses, secondary coils connected to said spaced conductors and said zig-zag conductor respectively, stationary primary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils respectively, whereby said received current impulses are converted into high frequency currents, said currents being inductively transmitted to said conductors and electrodes by said primary and said secondary coils.

7. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a rotating drum, spaced conductors angularly disposed relative to the axis of said drum and a continuous zig-zag conductor on the surface of said drum, independent horizontally disposed electrodes spaced from the surface of said drum, one of said electrodes being adapted to span the opposite ends of adjacent angular conductors and the other electrode being adapted to span the zig-zag conductor, secondary coils connected to said spaced conductors and said zig-zag conductors respectively, stationary primary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils respectively, whereby said received current impulses are converted into high frequency currents, said currents being inductively transmitted to said conductors and electrodes by said primary and secondary coils, a continuously moving color impregnated film adapted to pass between said conductors and said electrodes said film being subjected to the passage of said high frequency currents, whereby said film is continuously scanned upon the movement of said film relative to said conductors and electrodes.

8. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a rotating drum, spaced conductors angularly disposed relative to the axis of said drum and a continuous zig-zag conductor on the surface of said drum, independent horizontally disposed electrodes spaced from the surface of said drum, one of said electrodes being adapted to span the opposite ends of adjacent angular conductors and the other electrode being adapted to span the zig-zag conductor, secondary coils connected to said spaced conductors and said zig-zag conductors respectively, stationary primary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils respectively, whereby said received current impulses are converted into high frequency currents, said currents being inductively transmitted to said conductors and electrodes by said primary and secondary coils, a continuously moving color impregnated film adapted to pass between said conductors and said electrodes, said film being subjected to the passage of independent high frequency currents simultaneously whereby said color impregnated film is instantaneously and permanently altered in accordance with the received varying television and sound current impulses.

9. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a rotating drum, spaced conductors angularly disposed relative to the axis of said drum and a continuous zig-zag conductor on the surface of said drum, independent horizontally disposed electrodes spaced from the surface of said drum, one of said electrodes being adapted to span the opposite ends of adjacent angular conductors and the other electrode being adapted to span the zig-zag conductor, secondary coils connected to said spaced conductors and said zig-zag conductors respectively, stationary primary coils within said drum concentric with said

secondary coils, and sound and television receivers connected to said primary coils respectively, whereby said received current impulses are converted into high frequency currents, said currents being inductively transmitted to said conductors and electrodes by said primary and secondary coils, a continuously moving color impregnated film adapted to pass between said conductors and said electrodes, said film being subjected to the passage of independent high frequency currents simultaneously whereby said color impregnated film is instantaneously and permanently altered in separate zones thereon in accordance with the varying received television and sound current impulses respectively.

10. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a rotating drum, spaced conductors angularly disposed relative to the axis of said drum and a continuous zig-zag conductor on the surface of said drum, stationary independent horizontally disposed electrodes spaced from the surface of said drum, one of said electrodes being adapted to span the opposite ends of adjacent angular conductors and the other electrode being adapted to span the zig-zag conductor, secondary coils connected to said spaced conductors and said zig-zag conductors respectively, stationary primary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils respectively, whereby said received current impulses are converted into high frequency currents, said currents being inductively transmitted to said conductors and electrodes by said primary and secondary coils, a continuously moving color impregnated film adapted to pass between said conductors and said electrodes, said film being subjected to the passage of said high frequency currents, means for propelling said film continuously between said conductors and said electrodes and means connecting said film propelling means with said drum whereby the circumferential speed of said drum is relatively greater than the linear speed of said film.

11. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a rotating drum, spaced conductors angularly disposed relative to the axis of said drum and a continuous zig-zag conductor on the surface of said drum, independent horizontally disposed electrodes spaced from the surface of said drum, one of said electrodes being adapted to span the opposite ends of adjacent angular conductors and the other electrode being adapted to span the zig-zag conductor, secondary coils connected to said spaced conductors and said zig-zag conductors respectively, stationary primary coils within said drum concentric with said secondary coils, and sound and television receivers connected to said primary coils respectively, whereby said received current impulses are converted into high frequency currents, said currents being inductively transmitted to said conductors and electrodes by said primary and secondary coils, a continuously moving color impregnated film adapted to pass between said conductors and said electrodes, said film being subjected to the passage of said high frequency currents, means for propelling said film between said rotating drum and said electrodes, and means connecting said film propelling means with said drum whereby the direction of motion of the drum surface adjacent said film is in opposition to the motion of said film.

12. A television and sound apparatus for recording varying current impulses from a television and sound transmitter, a rotating drum, spaced conductors angularly disposed relative to the axis of said drum and a continuous zig-zag conductor on the surface of said drum, independent horizontally disposed electrodes spaced from the surface of said drum, one of said electrodes being adapted to span the opposite ends of adjacent angular conductors and the other electrode being adapted to span the zig-zag conductor, secondary coils connected to said spaced conductors and said zig-zag conductors respectively, stationary primary coils within said drum concentric with said secondary coils and sound and television receivers connected to said primary coils respectively, whereby said received current impulses are converted into high frequency currents, said currents being inductively transmitted to said conductors and electrodes by said primary and secondary coils, a continuously moving color impregnated film adapted to pass between said conductors and said electrodes, said film being subjected to the passage of said high frequency currents through separate zones of said film at the intercepts of said zig-zag and spaced conductors with said electrodes, one of said intercepts traversing one of said zones in alternate directions and the other of said intercepts traversing the other of said zones in one direction only whereby both zones of said film are simultaneously and continuously scanned upon the movement of said film relative to said conductors and electrodes.

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