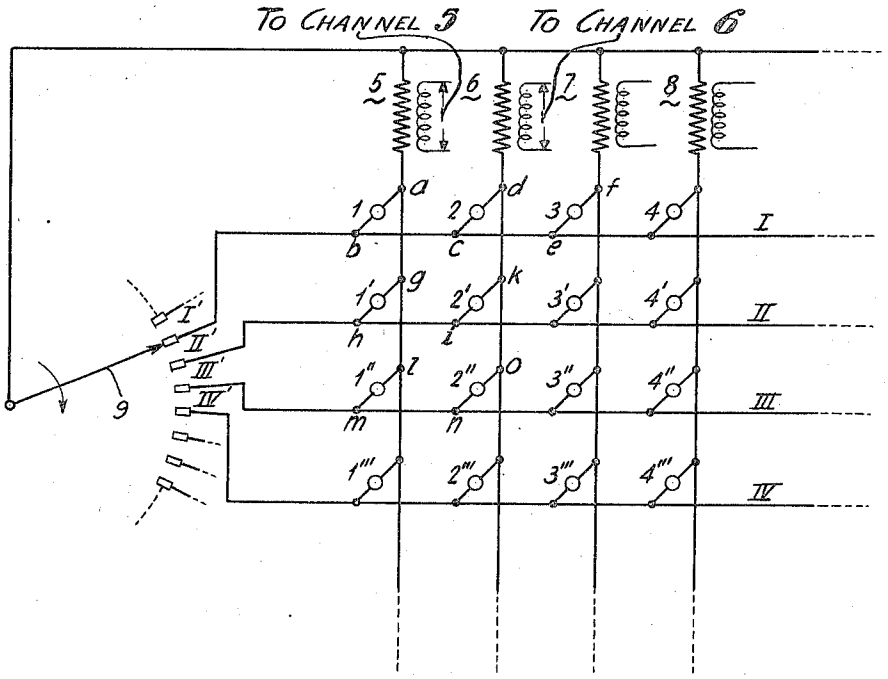
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TELEVISION APPARATUS

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TELEVISION APPARATUS

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My invention relates to television apparatus, and more particularly to that type of transmission wherein transmission is accomplished by means of a multichannel arrangement, and reception is accomplished by means of a bank of image point reproducing lights.

The art of television at the present time embodies a number of different types of receivers. Among the various types of receivers has been disclosed a receiver of the nature wherein each picture point is reproduced by means of a cell or light which produces light of an intensity in proportion to the optical intensity of the picture to be produced according to the point which the particular light identifies. The entire reproduction is accomplished by means of rows of these lines at right angles each to the other and forming together a square or rectangular bank which makes up the whole picture area. The prior art along this line has suffered from the disadvantage that of necessity each of the lines is joined in shunt with a number of other picture point reproducing lights and, accordingly, when one of these is energized there is a tendency on the part thus connected in shunt therewith to glow and thus produce a distortion of the picture or a disturbing haze and, accordingly, it is an object of my invention to provide a reproducer in which this fault is obviated.

By eliminating the spurious or undesired glow of the elements joined in shunt to the particular element being energized, it is possible to energize any single picture point to a higher level than has previously been possible and, accordingly, due to the increased brilliance representing the lightest portions of the optically reproduced picture, the detail of the reproduced picture may be greatly increased.

Again, as is illustrated in the drawing, and also as has hereinbefore been referred to, the tendency of the elements joined in shunt to the particular element being energized, being to glow at a decreased level, this glow represents dissipation of energy in an undesired form and, accordingly, it is another object of my invention to provide a receiver in which these usual losses will be obviated.

My invention will be best understood by reference to the single figure of the drawing in which a plurality of light producing elements 1, 1', 1'', 1'''; 2, 2', 2'', 2'''; 3, etc. are formed in the form of a bank, and each of the vertical rows of light reproducing elements as, for instance, 1, 1', 1'', 1''' are joined on one side to an amplifier channel which, in the instance of those points represented by 1, 1' etc., is the channel identified as 5. The other side of each of these reproducing elements is joined to a cross-connection at right angles to the line running from the receiver channel, and each of these cross elements, identified as I', II', III' and IV' is joined to a commutator segment, the latter cooperating with a switch 9, the switch itself being connected to each of the amplifier channels.

It will be appreciated that the rotating switch 9 might comprise a cathode ray switch arrangement or an ordinary revolving switch arrangement, etc. It will be seen, therefore, that if the channels 5, 6, 7, and 8, for instance, are energized simultaneously, then each of the reproducing elements along the horizontal line which at that particular instant is being contacted by the rotating switch 9, will be energized.

For purposes of illustration, let us assume that the rotating switch 9 is in the position shown in the drawing, that is to say, is contacting with the commutator segment identified as II, then if all of the channels 5, 6, 7, and 8 are energized simultaneously each with a signal representative of a picture point, then picture reproducing elements 1, 2, 3, and 4 will glow with an intensity proportional to the strength of the current passing therethrough, as the line identified as I forms a common return for each of the elements 1, 2, 3, 4 provided that the light threshold value of each of these light reproducing elements is exceeded in each case by the strength of the signal which is impressed thereon.

Now, it will be noted that if light reproducing elements, for instance, identified as 1 is energized, then by way of path aghikdc the lights 1', 2' and 2 are in shunt with the lamp 1, the former being in series each with the other. Accordingly, the voltage drop across the lamps 1', 2' and 2 must equal to the voltage drop across the lamp 1 or, if these lamps all have the same light threshold value, then the voltage drop across each of the lamps 1', 2' and 2 will be a third of that across lamp 1. Accordingly, by making the light threshold value of each of these lamps sufficiently high, the voltage drop across these three lamps in series will be insufficient to exceed the threshold response and, accordingly, the undesired disturbing light or glow is obviated. It will be seen that there are a number of other sets of lamps also in shunt with lamp 1, but for illustrative purposes it is sufficient to explain the action for merely one of the lamps.

Each of the channels 5, 6, 7, and 8 is joined to the photoelectric elements responding to one ver-

tical line on the picture to be reproduced, as illustrated in the drawing, wherein is shown the transformer in each case, the secondary of which is joined to a line of lamps and the primary of which is joined to a picture channel.

If in an arrangement as just outlined incandescent lamps were used to produce the light as illustrated as lamps 1, 2, 3, etc., the circular arrangement as shown herein might not prove feasible. In this case, assuming an equal number of vertical and horizontal lines, then a total of n^2 picture elements would be reproduced for n lines vertically and n lines horizontally. However, due to the multiple shunt arrangement, the incandescing lamps might glow at highly reduced voltages and although the glow might not be persistent to the extent of forming a brilliant light, nevertheless, a spurious or undesired glow would be produced. This probably would not be further obviated by the fact that the signals in each of the channels were co-phasal, the latter being made possible by the periodic modulation at a sufficiently high frequency at the transmitter for the picture. Hence, an essential feature and object of the invention which has for its aim the simplifying of the distributor system is the provision that while the co-phasal condition of transmission of the signals in each of the channels is still maintained at the transmitter, nevertheless the sources of light as, for instance, 1, 2, 3, etc. are arranged to have a definite threshold value of response which will not be exceeded when these elements form a shunt path to an element being energized. This may be done by the use of glow tubes or by the use of lamps which produce light by means of the fluorescence of an electron bombarded screen, the latter may have a control grid which controls the threshold value of luminescence.

Since such glow tubes are cathode ray tubes which possess a fixed response potential, if the maximum E. M. F. in the secondary windings of the transformer shown in channels 5, 6, 7, and 8 does not surpass twice the value of the response potential, it follows that clearly only those cells will be excited which are not in a shunt path comprising a plurality of cells in series. In other words, let us assume the aforementioned condition that the cells 1', 2' and 2 form a shunt path with the cell 1, when the switch is in the position in the drawing, then unless the E. M. F. in the secondary winding of the transformer in channel 5 is equal to three times the threshold response of each of the cells, then cells 1', 2' and 2 will not glow since this voltage will be insufficient to pass the threshold value of each, these cells being in series each with the other. Again, in the case of glow tubes, the range of brightness may be entirely availed of by an energizing voltage range of less than one to two.

In order that with such tubes a well defined voltage distribution in the assembly may be secured, that is to say, in order that the operation may be made independent of stray or accidental capacities of the constituent elements, resistances of a high value should preferably be mounted in a parallel relationship to each of the tubes, the resistance being designed to secure uniform distribution of the terminal voltage furnished by the distributor or changeover switch means, insofar as the series connected lamps which form a shunt path to an energized lamp is concerned. In this manner, if the threshold response of lamp 1' should be different from that of lamps 2' and 2, a high resistance would insure an even voltage drop across each of the lamps and the drop across any of the resistance would still be insufficient to exceed the threshold value.

Having thus described the invention, what is claimed and desired to secure by Letters Patent is the following:

1. An image reconstructing panel comprising a plurality of light producing elements each having a predetermined threshold value of response and arranged in a series of rows and columns, a plurality of conductors also arranged in a series of rows and columns and mutually perpendicular to each other, an electrical connection between each light producing element and one of each of the conductors arranged in row formation and in column formation to provide a series of connections simulating a point of intersectional connection of said row and column conductors, a source of voltage connected with each of the conductors arranged in column formation, and means for energizing the conductors of the rows and columns in sequence by a voltage having a magnitude less than twice the threshold value of response for each individual light producing element.

2. An image reproducing panel for re-creating electro-optical image representations which comprises a plurality of electrically activated light producing elements each requiring a predetermined magnitude voltage impulse to initiate light therefrom, said light producing elements being arranged in a plurality of rows and columns mutually perpendicular to each other, a plurality of conductors also arranged in a series of rows and columns to form a mesh-like network, an electrical connection between each light producing element and the conductor for each column and row adjacent thereto to provide points of intersectional connection between the several column and row conductors, means for energizing the conductors of each row at one predetermined rate, and means for energizing each column conductor at a different predetermined rate, and means for limiting the magnitude of the energizing voltage applied to one of the series of conductors to a magnitude less than twice the magnitude of the threshold response value to initiate light from one of the light producing elements so as to restrict the instantaneous illumination produced by energizing the column and row conductors instantaneously to a single light producing element only.

3. The system claimed in claim 1 wherein each of said light producing elements is a grid controlled gaseous discharge tube.

4. The system claimed in claim 1 wherein each of the light producing elements is a grid-controlled gaseous discharge tube, and wherein means is provided for biasing each of said tubes to such potential that the maximum effective intensity signal energy supplied to any row or column conductor is less than twice the magnitude of a voltage impulse necessary to energize any individual light producing element.

5. The system claimed in claim 1 comprising in addition an ohmic resistance connected in parallel to each light producing element to obtain uniform voltage distribution along a series of light producing elements.

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