Feb. 21, 1961 H. A. MICHLIN 2,972,719

ELONGATED TRANSLATING SYSTEMS AND SELECTIVE SWITCHING THEREBY

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FIG. 1

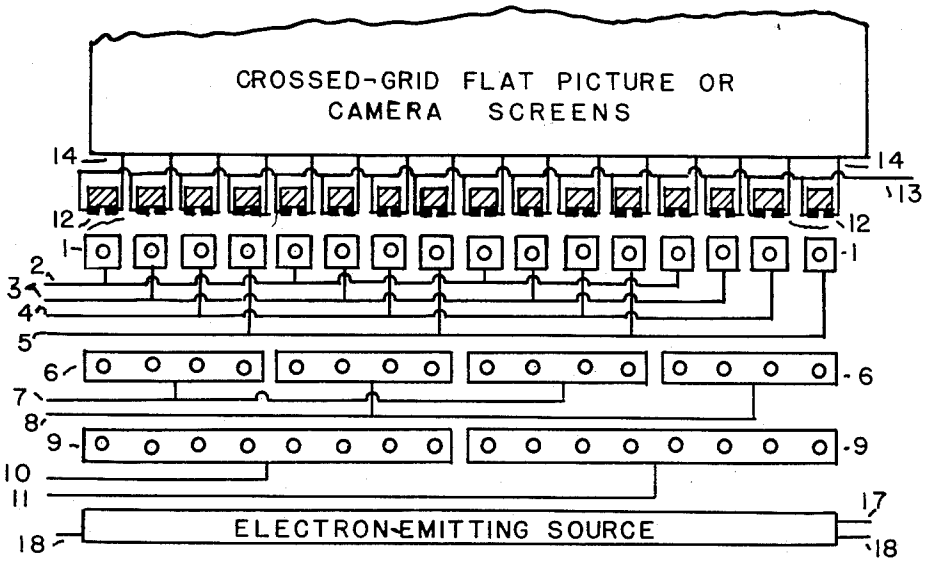
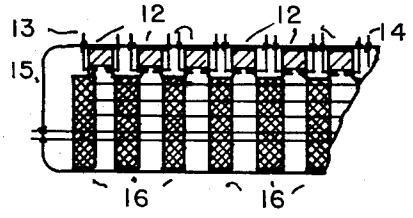


FIG. 2



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ELONGATED TRANSLATING SYSTEMS AND SELECTIVE SWITCHING THEREBY

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9 Claims. (Cl. 328—219)

This invention relates to longitudinally arranged translating and selective switching system, the selection of switching effected by the translation of different combinations of a small plurality of separate signal channels of a larger number of separate signal channels to selectively activate switching elements.

In the producing of images on portable flat luminescent screens which can be moved above, there is a need for an elongated switching system of small cross-sectional area for use as a border of such a screen. Which screen can be remotely controlled by a comparatively smaller number of selective conductors or radio wave frequencies than the much greater number of switching elements required.

One object of this invention is to provide such system. Another object is to provide a translating and switching control system in an elongated electronic tube capable of being formed as a border of a large load device. Another object is the use of electron bombardment induced conductance substances as switching elements in combination with translating system.

Other objects and advantages of my invention may be had by referring to the following description and claims when taken in connection with the accompanying drawings wherein:

Figure 1 is a schematic illustration of an example of a method and means of the invention.

Figure 2 is a schematic illustration of an example of a form of elongated tube.

Referring to Figure 1, for example, to schematically illustrate the invention.

The electron emitting source can be conventional, for example, a heated cathode with electrons transmitted thereto by conductor **17**. The heating element can be activated through conductors **18** for example.

Each of the conductive strips described below is a gating element.

The stage of gating elements **9** is composed of separated units of conductive strips, each conductive strip functioning as an anode, and each so constructed as to define eight separate apertures, each aperture exclusively in line with an aperture of the conductive strips of the stage of gating elements **1** and **6** (described below) so as to define separate electron paths each of a same cross-sectional area.

Each said conductive strip of the stage of gating elements **9** is electrically connected to either conductor **10** or **11** so that, for example, when a positive potential is transmitted through conductor **10**, the 1st conductive strip of the stage of gating elements **9** has positive potential impressed thereon so as to impart energy to electrons nearby from the electron emitting source to effect a transmission of eight electron streams therethrough in the manner of an anode with apertures.

The stage of gating elements **6** is composed of separated units of conductive strips, with each conductive strip functioning as an anode and is so constructed as to have four separate apertures therein, each aperture

exclusively in line with an aperture of a conductive strip of the stages of gating elements **1** and **9** so as to define four separated electron paths of a same cross-sectional area.

Each successive conductive strip of the stage of gating elements **6** is electrically connected to a conductor **7** or **8** in repeated sequence so that, for example, when a positive potential is transmitted through conductor **7**, the 1st and 3rd conductive strips have positive potential impressed thereon thereby imparting energy to electrons nearby from the apertures of the conductive strips in line therewith of the stage of gating elements **9** to effect a transmission of four electron streams therethrough in the manner of anodes with apertures therein.

The stage of gating elements **1** is composed of separated units of conductive strips, each of said strips functioning as an anode and is so constructed as to have one aperture therein to define one electron path therethrough.

Each successive conductive strip of the stage of gating elements **1** is electrically connected to a conductor **2**, **3**, **4** or **5** in repeated sequence so that, for example, when a positive potential is transmitted through conductor **2**, the 1st, 5th, 9th and 13th conductive strips have positive potential impressed thereon so as to impart energy to electrons nearby from the apertures of the conductive strips in line therewith of the stage of gating elements **6** to effect a transmission of the electrons through the aperture of the first conductive strip in the manner of an anode with an aperture therein activated with positive potential.

Electron bombardment induced conductance substances are arranged to function as switching elements **12** on being activated by electron impact. The areas between the conductors **13** and **14** connection to each of the switching elements **12** are aligned to be impacted by one exclusive stream of electrons transmitted through each exclusive separate electron path with such energy as is known to the art so as to raise the conductance level of the electron bombardment induced conductance substances impacted so as to effect a transmission of electricity between the conductors **13** and **14**. An example of one such switching element is described in Patent No. 2,543,039 using electron bombardment induced conductance substances.

It can be seen from the above description that a sequence of electron transmission through each continuous separate electron path can be effected to impact a switching element associated therewith by selectively changing the transmission of positive potential through each conductor **2**, **3**, **4** and **5** in one cycle of sequence to their respective conductive strips in the stage of gating elements **1** for each sequence change of transmission of the positive potential through each conductor **7** and **8** to their respective conductive strips in the stage of gating elements **6**; and for each cycle of changes of transmission of the positive potential through each conductor **7** and **8** to their respective conductive strips in the stage of gating elements **6** for each sequent change of the positive potential transmitted through each conductor **10** and **11** to their respective conductive strips in the stage of gating elements **9**. The impacting of electrons on each successive switching element of the line of switching elements **12** effecting a switching of signal from common conductor **13** to each separate conductor **14** in succession as separate electric outputs. If a video signal is used, then a different part of the video signal would be impressed on each switching element for transmission to their respective electric outputs in the line of separate electric outputs.

The stages of gating elements **1**, **6** and **9** can be structurally separated by insulation partitions **16** for firmness and the keeping of electron in their respective paths in an elongated vacuum tube as is schematically illustrated in Fig. 2. Each of the stages of gating elements **1**, **6** and **9** can be of conductive strips one (1) mm. apart and

one (1) mm. wide to make for a long tube of small cross-sectional area. Fig. 1 schematically illustrates switching elements along the length of the border of a crossed-grid flat picture or camera screens and in close proximity thereto.

Although sixteen (16) switching elements are schematically illustrated and described, it is to be understood that it is only by way of example as a larger number of switching elements can be used.

Referring to Fig. 1 to illustrate a method of operation. The electron emitting source is caused to emit electrons. The conductors **2**, **7** and **10** are impressed with positive potential so as to cause the eight streams of electrons to be transmitted through the eight apertures defining electron paths of the 1st conductive strip of the stage of gating elements **9** from the electron emitting source; the four apertures defining electron paths through the 1st conductive strip of the stage of gating elements **6** continues the transmission of and imparts energy to only the first four streams of the said eight electron streams; and the aperture of the 1st conductive strip of the stage of gating elements **1** continues and imparts energy to the first of the said four electron streams. The effected streams of electrons through the first exclusive continuous electron path impacts the 1st switching element with sufficient energy as to cause a transmission of electric energy therethrough between the common conductor **13** to a separate conductor **14** as an electric output.

A change in potential transmission is then effected by transmitting the positive potential through conductor **3** instead of through conductor **2** thereby effecting a different exclusive continuous path of electron transmission to impact the 2nd switching element to effect the transmission of current therethrough from the common conductor **13** to a separate conductor **14** as an electric output.

A change in potential transmission is then effected by transmitting positive potential through conductor **4** instead of through conductor **3** thereby effecting a different exclusive continuous electron path to impact the 3rd switching element to effect the transmission of current therethrough from the common conductor **13** to a separate conductor **14** as an electric output.

A change in potential transmission is then effected by transmitting positive potential through conductor **5** instead of through conductor **4** thereby effecting a different exclusive continuous path of electron transmission to impact the 4th switching element to effect the transmission of current therethrough from the common conductor **13** to a separate conductor **14** as an electric output.

The positive potential is then transmitted through conductor **8** instead of through conductor **7**. The changing of the potentials transmitted through the conductors **2**, **3**, **4** and **5** is repeated, as described above, to effect electron impact of the 5th, 6th, 7th and 8th switching elements in succession thereby effecting a transmission of electricity from the common conductor **13** through their respective switching elements in succession to effect separate electric outputs through conductors **14**.

The positive potential is then transmitted through conductor **11** instead of through conductor **10**; and the changing of the potentials is transmitted through the conductors **2**, **3**, **4** and **5**, and **7** and **8** is repeated, as is described above, thereby selectively effecting electric outputs from the selective activation of the switching elements **9** through **16** in succession.

Although I have described my invention with a certain degree of particularity, it is to be understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.

I claim:

1. Means for translating changing pluralities of selected channels of signals to a succession of exclusive electron paths to selected final outlets in succession comprising a plurality of stages of gating means, said stages in a connected series of electron paths, a different plurality of gating means in each stage; an electron source adapted to emit electrons to the first stage of the stages of gating elements; a plurality of signal channels in each stage, each signal channel arranged to activate at least one gating means in their respective stage, said gating means in each stage being a multiple number of the signal channels to each stage; each gating means of each stage of each next lesser plurality of gating means exclusively controlling electron paths to selected final outlets from a plurality of gating means of a stage of the next plurality of gating means, each said plurality of gating means having not more than the number of signal channels to each stage thereby on one of said gating means of each said plurality of gating means in each stage in series being activated by a signal through a selected signal channel of said signal channels in each stage there is effected an electron flow through an exclusive electron path to a selected final outlet, and on systematically and synchronously changing the combination of the signal channel transmitting the signal in each stage there is effected a translation of each such change of combination to a succession of changes of exclusive electron paths to a succession of selected final outlets.

2. The means of claim 1 in which the means is arranged longitudinally and in small cross-sectional area, the succession of final outlets arranged along the length thereof and, in addition, comprising a plurality of switching elements capable of being activated by electron impact, each of said switching elements arranged to be impacted by electrons flowing through one exclusive path of electrons, a common electric energy source to said switching elements for switching therethrough thereby on each switching element being activated by electron impact from the electron flow through each final outlet there is effected a sequence of switching of electric energy through each switching element.

3. The means of claim 2 in combination with a load device having a long border with conductors in spaced apart relation as the said switching elements, said conductors in line with and in close proximity to the said switching elements, and with the output of each of said switching elements electrically connected to said conductors.

4. The means of claim 1 in which the means is longitudinally arranged in an elongated vacuum tube, in which the electron paths are through space, in which each gating means have a separate electron transparent energizing opening for each electron final outlet it exclusively controls, said openings arranged to form exclusive separate continuous electron paths thereby each stage having the same number of exclusive separate continuous electron paths.

5. The means of claim 4 and switching elements capable of being energized by electron impact, each switching element suitably adapted to be energized by electron impact from a different exclusive separate continuous electron path.

6. The means of claim 5 in which the switching elements are suitably arranged units of electron bombardment induced element, each with a plurality of conductors suitably connected thereto and spaced from each other, each said unit arranged to be impacted by electrons transmitted through a different exclusive separate continuous electron path.

7. The means of claim 4 and insulation partitions suitably arranged to impart firmness to the elements thereof.

8. The means of claim 7 and switching elements capable of being energized by electron impact, each switching element suitably adapted to be energized by electron bombardment from a different exclusive separate continuous electron path.

9. The means of claim 8 in which the switching ele-

ments are suitably arranged units of electron bombardment induced element, each with a plurality of conductors suitably connected thereto and spaced from each other, each said unit arranged to be impacted by electrons transmitted through a different exclusive separate continuous electron path.

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