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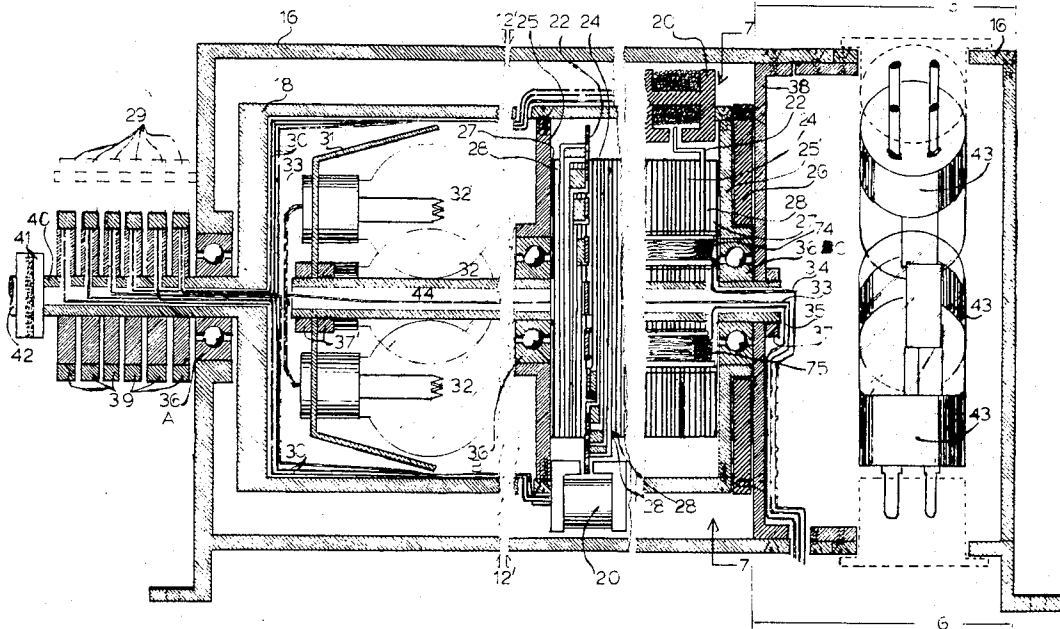
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[54] **AUDIO CONSOLE DELEGATION SYSTEM WITH VISUAL READOUT**
11 Claims, 3 Drawing Figs.

[52] U.S. Cl. **340/381,**
340/366
 [51] Int. Cl. **G08b 5/36**
 [50] Field of Search **340/381,**
382, 336, 380, 366, 378

ABSTRACT: An audio console delegation system distributor switching unit. Reed relays for selectively enabling a program source to a plurality of program busses and readout means for visually indicating which busses are enabled. Independent electrical lighting elements, each in a separate light well, direct light through a numerical indicia created by an open area in a black nonlight transmitting layer, then through a layer of white translucent material and finally through a panel of transparent smoke gray or red material to produce a sharp projection of the indicia on a mat exterior surface of the panel.



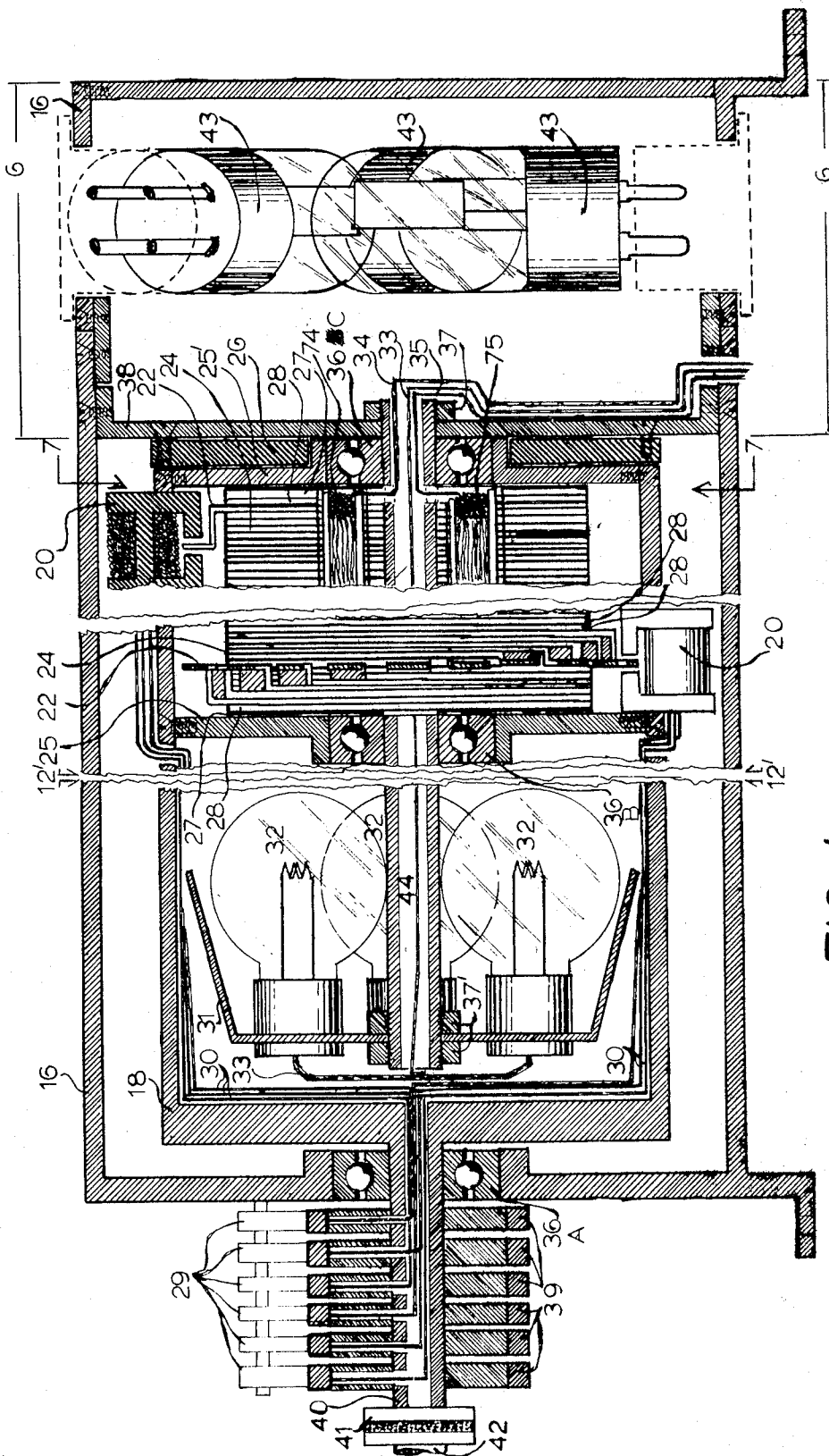
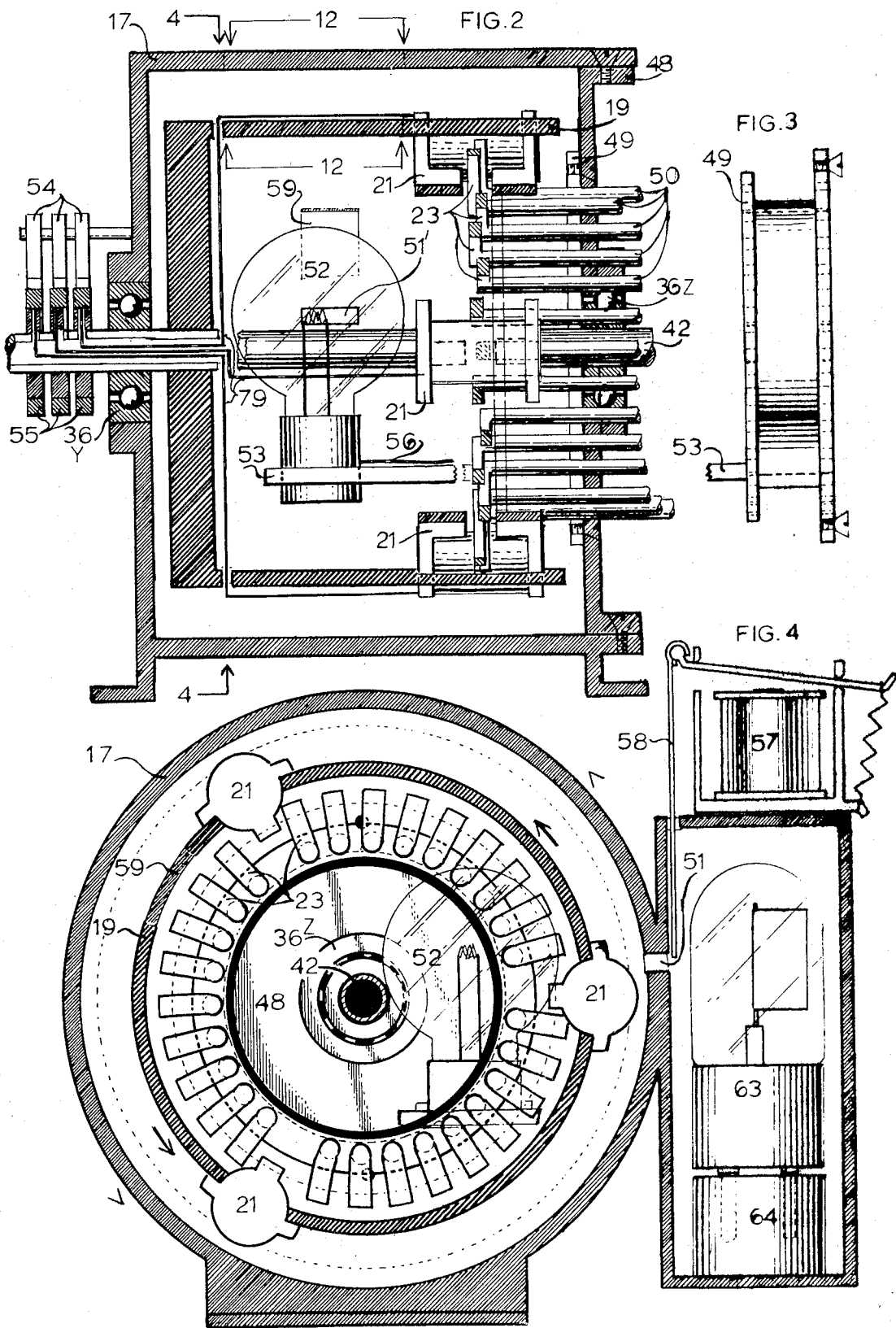


FIG. 1.



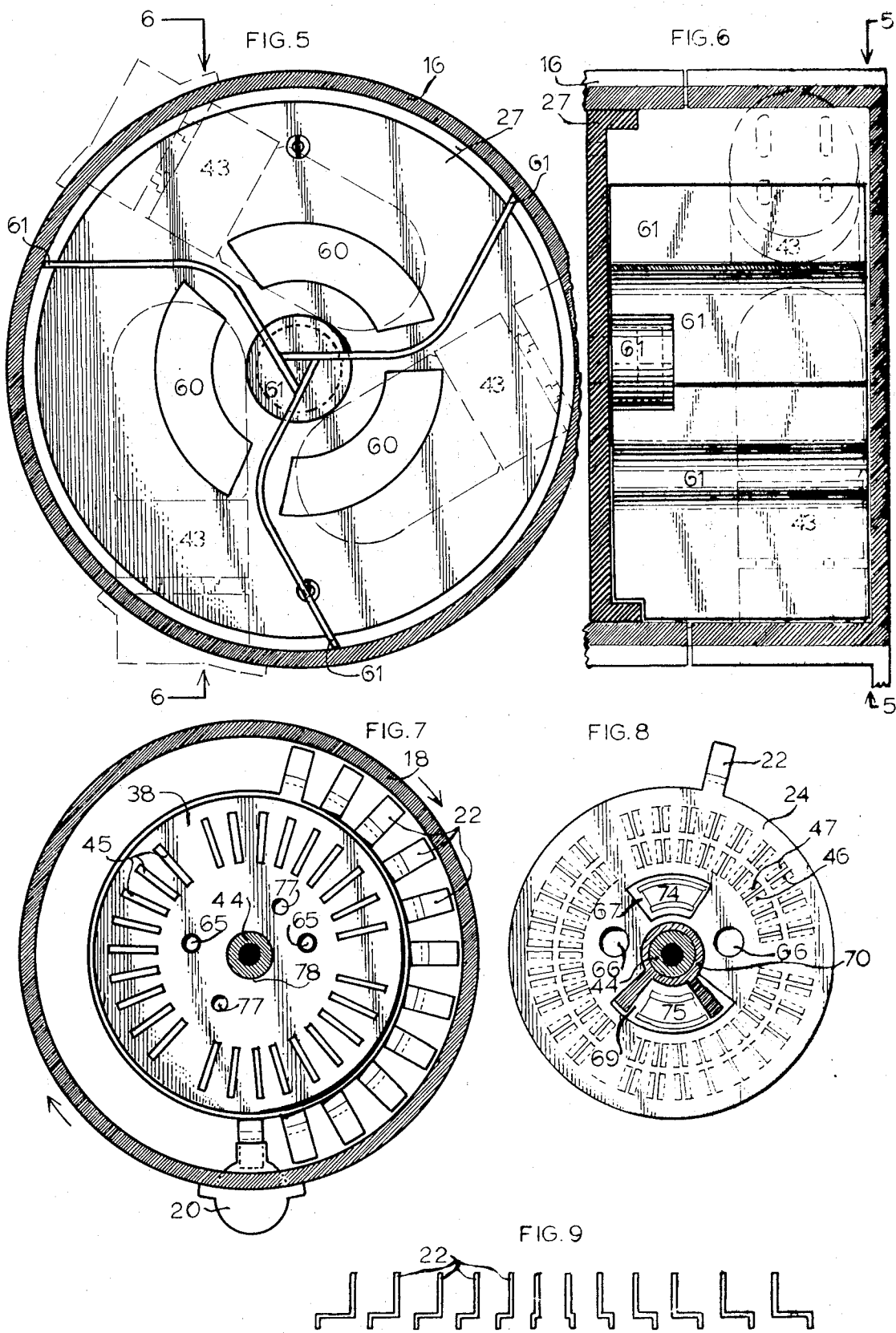


FIG.10

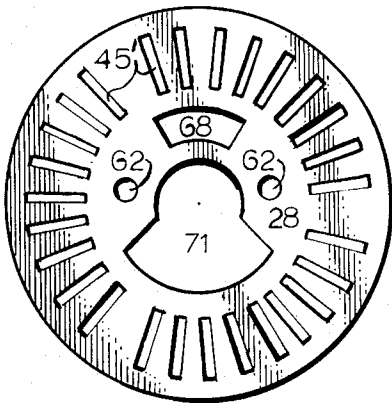


FIG.11

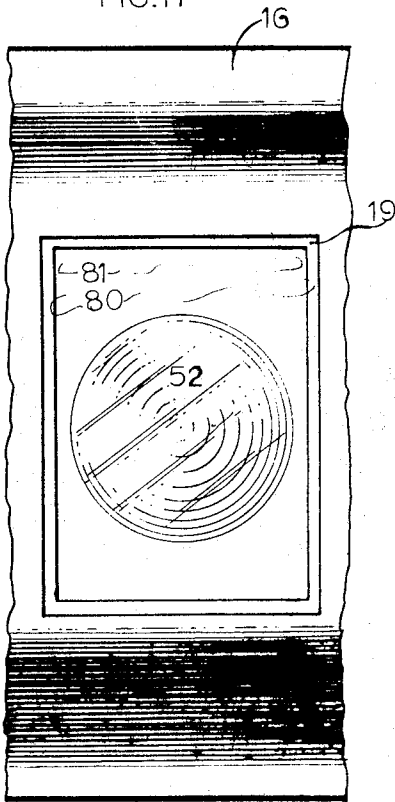


FIG.12

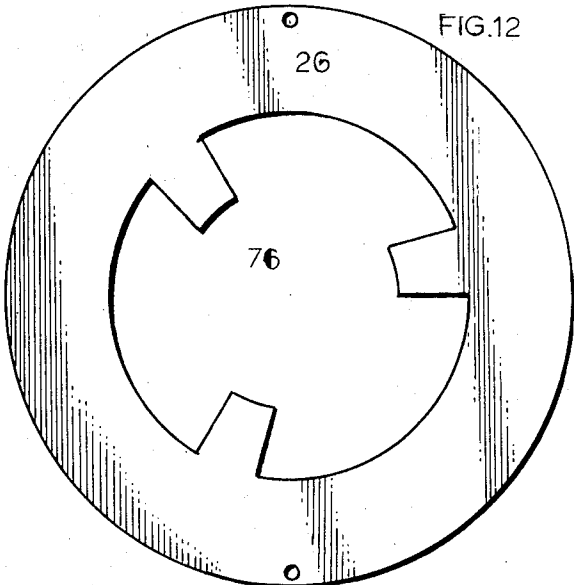


FIG.13

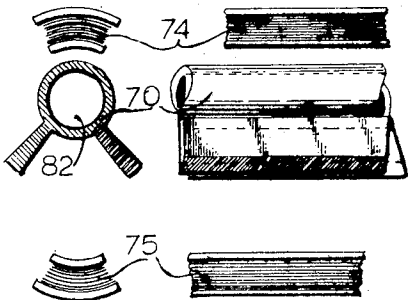


FIG.14

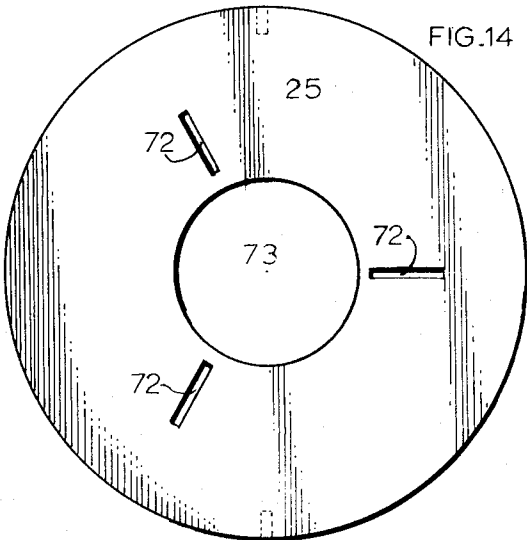
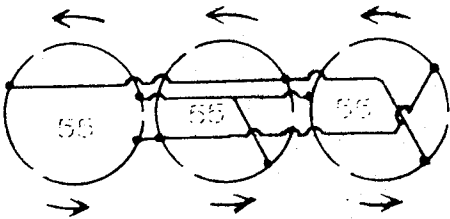


FIG.15



AUDIO CONSOLE DELEGATION SYSTEM WITH VISUAL READOUT

BACKGROUND OF THE INVENTION

This invention relates to distributor switching units or modules for an audio console delegation system which units include means for selectively enabling a program source to a plurality of program busses or program channels and more particularly to switching units of this character having readout means for visually indicating which busses are enabled.

The invention has for an object to provide switching units of the above character with a novel readout structure presenting by means of projected light clear and sharp indicia or tokens such as numerical designations, indicating which busses or channels are operative.

Another object is to provide switching units as in the preceding object that include readout means for showing when a switching unit is operative.

Still another object is to provide switching units of the above character in which the readout comprises columns of digits, each digit representing a different program buss and each independently rendered effective from a separate light source.

A further object is to provide switching units as in the preceding object wherein the digits in a column read consecutively from the top of the column down.

A specific object is to provide switching units of the above character in which the readout structure comprises independent electrical lighting elements for each indicia or digit, each enclosed in a light well open at its upper end and which when energized directs light rays through a numeral or other indicia above and in juxtaposition to it, which numeral or indicia is created by an open area in an opaque layer of black material, the light rays then passing through a layer of white translucent material in contact with the black layer and finally through a transparent smoky gray or red layer of material in contact with the white layer, and having a top surface which is of a mat finish, to produce on the latter during such time as the lighting element is energized, a clear and sharp reproduction of the indicia but which indicia is not visible when the lighting element is deenergized.

Still another object is to provide switching units of the above character in which the numerical indicia are arranged in two spaced groups, one containing the numerals one to 16 inclusive consecutively arranged in two vertical columns reading downwardly and the second group containing the numerals one to four inclusive consecutively arranged in two vertical columns reading downwardly.

The above and other objects, features, and advantages attending the present invention will be understood from consideration of the description of a preferred embodiment of the invention following the accompanying

DESCRIPTION OF THE DRAWINGS

wherein FIG. 1 is a front elevational view of the switching units of the invention showing in phantom the numerical indicia that will show on the readout panel forming the front of the switching unit;

FIG. 2 is a side elevation of the switching unit of the invention, a portion being shown in section to show one of the lighting elements and its well in relation to the composite readout structure, and wherein the relays for selecting the program busses are depicted generally; and

FIG. 3 is a sectional view somewhat enlarged taken at 3—3 of FIG. 2.

Referring to the drawings, the switching unit of the invention comprises a casing or container 10 preferably of metal, for receiving a plurality of reed relays or other forms of control switching and associated switch circuitry (not shown) generally represented by the numeral 12, adapted under control of means, not shown, and described in a concurrently filed application of Robert A. Bloom and Don E. Haddock Ser. No. 861,347 to selectively enable a program source to a plurality

of program busses or channels and further comprises a readout assembly generally designated by the numeral 16 secured to the casing 10 by screws 14 and substantially closing the front of the container 10.

The readout assembly 16 comprises a readout layer or panel composite generally designated by the numeral 18, a light well block 20 and a pair of lighting element-carrying blocks 22, 24. Each of the blocks is made of metal, such as aluminum, the block 20 to improve its heat dissipation properties and blocks 22, 24 to make them current conductors. The blocks 22, 24 are treated with an oxide inhibiting coating while the block 20 is given a hard black anodizing treatment to give it high electrical insulation properties so as to insulate it electrically from the container 10 and from the conductor blocks 22, 24 which provide one side or ground for a 24-volt circuit for the lighting elements to be described. The block 20 is secured to brackets 26 of the container by four screws 14. The layer composite 18 is secured to the block 20 by two screws 28. The block 22 is secured to the block 20 by two screws 30 and the block 24 by two screws 32. The screws 30 and 32 are preferably made of nylon insulation material or if of metal are provided with electrical insulating sleeves and washers (not shown) to insulate them electrically from the blocks 22 and 24.

The layer composite 18 comprises an outer panel 34 of substantially rigid transparent colored material such as a substantially rigid synthetic plastic or tempered glass. A plastic such as plexiglas has been found preferred and it is desirable that the plastic have high temperature resistance so as to inhibit warping. The panel should have a mat finish on its outer face 36. This may be produced by rubbing the surface with a fine steel wool, or by sandblasting. Such provides a screen 37 on which the indicia hereinafter referred to are to be projected. For the purposes of this invention the panel 34 will be of a color selected from the group consisting of smoke gray and red. Smoke gray such as provided by Cadillac No. 2074 Plexiglas for example, made by Cadillac Plastic and Chemical Co. is preferred since it best inhibits visibility of the indicia until illuminated from within the unit and together with the mat finish provides excellent contrast enabling clear and sharp projections of the indicia without any thick fringe problem.

Secured against the back face 38 of the panel 34 is a relatively thin uniform layer 40 of white translucent material. The function of this layer is twofold. First it produces enough diffusion of the light rays from the source as to produce a uniformly lighted indicia at the screen and contributes to its sharpness of outline at such surface. Secondly, it blocks out any visibility of the lighting element filament through the mat finish screen which will occur if this translucent layer is not used. Although this layer 40 may be a layer, for instance of plastic material, separate from the panel 34 it is preferred to form such layer 40 by silk screening the rear face 38 of the panel 34 with a uniform coating of white pigmented lacquer to provide a flexible translucent layer of about 0.001 inch and less thickness. Such a coating may be provided by using a "Naz Dar" white paint No. 1112.

Contacting and secured to the layer 40 is a further relatively thin uniform layer 42 of opaque material preferably black, capable of substantially inhibiting the transmission of light rays therethrough. It is this layer that is provided with open areas or cutouts 43 forming the indicia or tokens referred to above through which light may be projected from the lighting elements to the mat screen 37 of panel 34. As seen in FIG. 1 such indicia may for example consist of two groupings 44, 46 each of two columns of digits, one column in the group 44 depicting the numerals one to eight inclusive and the other the numerals nine to 16 and one column in the group 46 depicting the numerals one and two and the other the numerals three and four. By preference these columns of numerals read consecutively in increasing order starting from the top and going down. In addition to the numerical indicia there may be provided in the opaque layer 40 an open area to depict a word or words such as the word "audio" which may be used to indicate when the switching unit is operative. Such a word is shown in phantom at 48 in FIG. 1.

As in the case of the layer 40 the layer 42 may be a thin layer or strata separated from the layer 40. It is preferred however to form this layer 42 as an integral layer with the layer 40 and panel 34 by silk screening the layer 40 with a uniform coating of suitable black paint preferably a black pigmented lacquer to provide an opaque layer 42 of about 0.001 inch and less thickness, the areas to produce the indicia shown in FIG. 1 in phantom being blocked out in the screening process. Naz Dar black lacquer No. IL111 has been found to produce a satisfactory coating layer.

Each indicia, as evident from FIGS. 1 and 2 is backed by a light well which in the case of the numerical indicia are circular bores 50 and in the case of the word indicia is an elongated bore 52 all of which bores extend completely through the block 20 and are independent of each other so as to inhibit the leakage of such amounts of light from one well to another adjacent one, as would produce a projection of the indicia served by the latter on the mat surface 37 of the readout panel 34.

Each of the bores 50 receives the filament or bulb end 54 of a suitable 40 milliamper miniature electrical lighting element 56 and the bore 52 receives two of these elements 56. Each lighting element is received with a press snap fit in a shouldered spring fingered metal socket 58 in electrical contact with the body 60 of the lighting element. This provides one side of the lighting element circuit. The sockets 58 in turn snap into shouldered bores 62 in the blocks 16 and 24. The base of each socket 58 includes an insulation washer 64 which carries a spring contact leaf 66 centrally thereof insulated from the metal of the socket for contacting the central contact 68 of the lighting element to provide the other side of the lighting element circuit. A suitable separate contact lead 70 is connected to the contact 66 of each socket while a single lead 72 connects with each of the blocks 22, 24.

A feature of the invention is the provision of air circulation or heat dissipation slots to minimize the air temperature generated adjacent the panel 34 by the lighting elements 56. For this purpose an elongated slot 76 is provided between the panel 34 and block 20 provided by a shallow recess 78 formed in the top surface of block 20 and slots 80 and 82 respectively of a similar nature provided in the top surfaces of the blocks 22, and 24. Each of these slots extends across the full width of its respective block. In addition slots 84 may be provided in the sidewalls and elsewhere on the container 10.

In operation of the unit, when at the command of other controls the unit is rendered operative, the lighting elements 56 behind the word AUDIO will be energized thus indicating to the console operator that such unit is functioning. As a program source is thereafter connected to one or more program busses or channels through operation of the relays or other controls in the unit numerical indicia representative of such busses will become visible by the lighting elements 56 behind them which will then become energized.

From the foregoing description of the invention it will be evident that a novel delegation system with visible readout has been provided that is well suited for a console control board. It will be understood that although the unit has been described in connection with its use for connecting an audio program source to a plurality of program channels it will also be useful for video and other applications. Moreover various other changes and modifications of the structure shown and described will occur to those skilled in the art without departing from the spirit and intent of the invention and all such changes, modifications and equivalent applications and structures are contemplated as come within the purview of the following claims.

I claim:

1. In a distributor-switching unit for an audio console delegation system including means for selectively enabling at least one program source to at least one buss; readout means for visually indicating that a buss is enabled comprising an outer substantially rigid readout panel of transparent material of a color providing visibility inhibiting characteristics therethrough in the absence of illumination from a source adjacent said panel, said panel having outer and inner faces, the

outer face of said panel having a mat surface finish in the area thereof constituting the readout area, a thin layer of white translucent material in contact with the inner face of said panel and extending over said face so as to cover the readout indicating area thereof, a thin layer of opaque black material which will inhibit the transmission therethrough of light from a source within said unit, said black layer extending over and being in contact with said white layer and having open areas representative of readout indicia to be visible at the outer mat face of said panel when light from said source is directed through said open areas and through said white layer and panel to said mat surface, and a source of light externally of said panel in juxtaposition to said black layer.

2. A switching unit as claimed in claim 1, wherein said readout panel is of a smoke gray synthetic plastic material.

3. A switching unit as claimed in claim 1, wherein said open areas in said black layer when viewed from the side in contact with said white layer delineate a pair of columns of indicia each column comprising a plurality of spaced-apart independent indicia.

4. A switching unit as claimed in claim 3, wherein said source of light comprises a plurality of independent electrical lighting elements at least one behind each indicia.

5. A switching unit as claimed in claim 1, wherein said open areas in said black layer when viewed from the side in contact with said white layer delineate a pair of columns of indicia, each column comprising a plurality of spaced-apart independent indicia, and wherein said source of light comprises structure providing a plurality of independent light wells of non-light transmitting material, at least one behind each indicia, and means for mounting an independent electrical lighting element in each of said light wells, each said light well being capable of substantially concentrating the light from a lighting element when mounted therein on the indicia in front of such light well and substantially excluding the light of this lighting element from any other indicia and the light wells behind such other indicia.

6. In a distributor-switching unit for an audio console delegation system, said unit including means for selectively enabling a program source to a plurality of program busses: readout means for visually indicating which busses are enabled comprising a readout panel of transparent material of a color providing visibility inhibiting characteristics therethrough in the absence of illumination from a source within said unit, said panel having outer and inner faces and said outer face having a mat surface finish in the area thereof constituting the readout area, a thin layer of white translucent material in contact with the inner face of said panel and extending over said inner face so as to cover the readout indicating area thereof, a thin layer of opaque black material which will inhibit the transmission therethrough of light from a source within said unit, said black layer extending over and being in contact with said white layer and having open areas representative of readout indicia to be visible at the outer mat face of said panel when light from said source is directed through said open areas and through said white layer and panel to said mat surface, said open areas in said black layer when viewed from the side in contact with said white layer delineating a pair of columns of indicia each column comprising a plurality of spaced-apart independent indicia, a source of light in juxtaposition to said black layer comprising a plurality of independent electrical lighting elements at least one behind each indicia, a container for carrying said enabling means and readout means, a first block supported by said container and seating said panel, a second block supported by said first block and having a plurality of spaced bores for receiving and mounting the base portions of some of said lighting elements, said lighting elements having their filament ends projecting above said second block to a point in juxtaposition to said panel, said first block also having a plurality of bores coincident with those of said second block for receiving and surrounding the said filament ends of said elements, each said bore defining an independent light well for the filament end it

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receives capable of substantially concentrating the light from such filament end on the indicia above it and being capable of substantially excluding light from a filament in any other of said bores of said first block.

7. A switching unit as claimed in claim 6, wherein said first block is colored black in all of its said bores and on its face adjacent said readout panel.

8. A switching unit as claimed in claim 6, wherein there is an air circulation slot formed between the readout panel and first block and another between said first and second blocks, said slots extending the full width of said blocks and lengthwise of said blocks over said bores.

9. A switching unit as claimed in claim 6, including a third

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block supported by said first block and endwise adjacent said second block said third block having a plurality of spaced bores for receiving and mounting the base portions of the remainder of said lighting elements and said bores in said third block being substantially coincident with bores in said first block.

10. A switching unit as claimed in claim 6 wherein one of said bores in said first block is transversely elongated to receive a plurality of filament ends and wherein the indicia illuminated by said filament ends comprises a word.

11. A switching unit as claimed in claim 6 wherein said readout panel is of a smoke gray color.

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