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LIGHT FOR INDICATING WAVE PATTERNS

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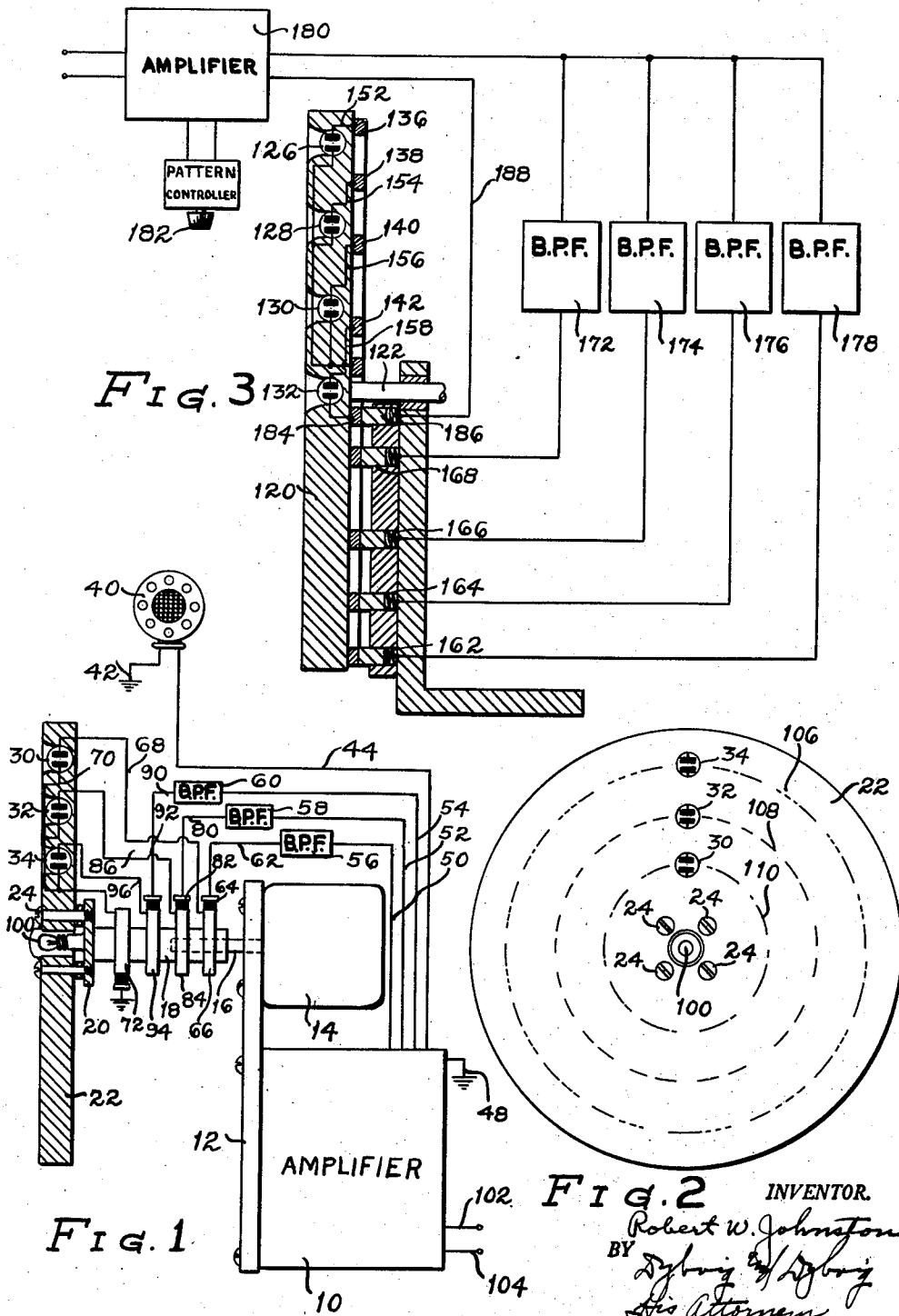


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LIGHT FOR INDICATING WAVE PATTERNS

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1 Claim. (Cl. 177-346)

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This invention relates to a visual indication of various types of sound waves, which invention may be used either for scientific analysis or for entertainment.

Oscillographs, oscilloscopes and various other devices have been used in connection with vibrations that may be formed by various means.

An object of this invention is to provide a device for visually indicating the characteristics of sound vibrations or other vibrations.

Another object of this invention is to provide a plurality of rotatably mounted lights generating separate paths, the lights being energized by various band widths capable of flashing whenever a predetermined voltage is attained and going out at a predetermined cut-out voltage, to thereby flash patterns depending upon the characteristic of the sound waves.

Another object of this invention is to generate a signal in response to sound waves, which generated signal passes through a series of band pass filters, the output of each band pass filter being used to energize a movable light that illuminates whenever the input voltage reaches a predetermined magnitude and goes out whenever the voltage drops to a predetermined value.

Another object of this invention is to provide a rotatably mounted disc used for the purpose of entertainment and flashing a pattern determined by variable vibrations.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

In the drawings, Figure 1 discloses a cross-sectional view of the mechanism together with a schematic wiring diagram associated with the mechanism.

Figure 2 is a front elevational view of the rotatably mounted disc, as viewed from the left of Figure 1.

Figure 3 discloses a modification of the device disclosed in Figure 1.

Referring to the drawings, the reference character 10 indicates a housing supporting a standard 12 having mounted thereon an electric motor 14. The armature shaft 16 of the electric motor is connected to a shaft 18. This shaft 18 has fixedly attached to one end a plate 20 supporting a disc 22 by means of a plurality of screws or bolts 24, so that the disc 22 rotates with the shaft 18, which in turn is driven by the armature shaft 16. The disc 22 supports the lights 30, 32 and 34. These lights may be gas filled tubes, such as neon tubes, argon tubes or any other suitable tubes or

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lights. Gas filled tubes have a very desirable characteristic for this purpose, in that the tube will not illuminate excepting when the impressed voltage attains a predetermined value. Furthermore, these tubes have a sharp cut-out voltage, so that whenever the voltage drops to a predetermined value, ionization of the gases ceases instantly for all practical purposes. That being the case, the gas filled tubes will only be illuminated during the period that the impressed voltage is above predetermined value.

For the purpose of illustration, a microphone 40, grounded at 42 and connected by a lead 44, has the output supplied to an amplifier in the housing 10 for amplifying the signal. This amplifier is grounded at 48 and has a plurality of outlet leads 50, 52 and 54 connected to the band pass filters 56, 58 and 60. These band pass filters are preferably designed to pass certain signals, excluding all others. For example, the band pass filter 56 may be used for passing signals up to a frequency of 500. The band pass filter 58 may pass signals from a frequency of 500 to 1000 and the band pass filter 60 may pass signals of a frequency higher than 1000.

The band pass filter 56 has its outlet connected by means of a lead 62 to a brush 64 contacting a slip ring 66. This slip ring 66 is connected by a suitable lead 68, shown schematically, to the one terminal of a gas filled tube 30. The other terminal of the gas filled tube 30 is grounded by means of a suitable lead 70 through the slip ring 72 to ground.

The band pass filter 58 is connected by means of a lead 80 to a brush 82 contacting a slip ring 84. The slip ring 84 is connected by a lead 86 to one terminal of the gas filled tube 32, also grounded through the slip ring 72. The band pass filter 60 is connected by a lead 90 to a brush 92 contacting the slip ring 94. The slip ring 94 is connected by a lead 96 to the one terminal of the gas filled tube 34, the other terminal of which is grounded through the slip ring 72.

A suitable light 100 may be located in the center of the disc 22 merely for the purpose of illumination and is energized from any suitable source of energy.

The amplifier 46 may be energized by connecting the leads 102 and 104 to a suitable supply of either direct or alternating current as the particular type of amplifier may require.

It may readily be seen that when the motor 14 is energized, it rotates the disc 22. Upon the amplifier 46 being connected to a suitable source of energy, and upon speaking in front of the

microphone 40, the electric signals flowing through the amplifier 46 from the microphone 40 will cause various signals to pass through the band pass filters 56, 58 and 60, so as to cause the several gas filled tubes 30, 32 and 34 to be illuminated only when a sufficiently high voltage is impressed upon each of the neon lights to cause ionization thereof, so as to cause patterns to be displayed on the face of the disc. These patterns have been schematically shown by the broken lines 106, 108 and 110 shown in Figure 2. Some of the gas filled tubes may be filled with a neon gas and others by argon gas or any other suitable gas. As is well known to those skilled in the art, ionization of neon gases gives off a red light. Ionization of argon gases gives off a blue light. If, for example, the tubes containing argon gas were enclosed in yellow glass, such tubes will give off a green light, the shade of which depends upon the intensity of the color of the glass and the intensity of the illumination.

Thus, it can be seen that from the signals within the voice range, three distinct patterns may be generated upon the face of the disc, the pattern depending entirely upon the qualities of the voice, sometimes referred to as the "timber" of the voice and the sounds submitted. Furthermore, these patterns may differ in color, as well as in pattern, for different sounds by the same voice. The same words being spoken into the microphone by different individuals will result in different patterns. One voice may have a great number of overtones, resulting in a complex pattern, especially in the higher frequencies, as compared with another voice having less overtones. Also, by controlling the magnitude of the currents transmitted to the band pass filters, the patterns may be altered, resulting in a very interesting phenomenon that is both instructive and interesting. Although the speaking voice has been referred to, any other source of sound could be used to vibrate the microphone.

In the modification disclosed in Figure 3, a disc 120 is fixedly attached to a shaft 122 mounted in a standard and adapted to be driven by an electric motor, not shown. In the modification the disc 120 has mounted therein a plurality of gas filled tubes 126, 128, 130 and 132. To the rear of the disc 120 there is mounted a series of slip rings 136, 138, 140 and 142 connected by leads 152, 154, 156 and 158 respectively to the gas filled tubes 126, 128, 130 and 132. A series of brushes 162, 164, 166 and 168 connect the slip rings 136, 138, 140 and 142 respectively to the band pass filters 178, 176, 174 and 172 respectively, each being energized from an amplifier 180, the input of which may be energized by any suitable electrical signal, such as the microphone 40. The amplification of the amplifier 180 may be adjusted by means of suitable rheostats operated by a knob 182, to thereby alter the pattern swept out by rotating the disc 120 and energizing the neon lights by means of filtered signals.

Each of the neon lights is grounded to a slip ring 184 through a brush 186 and a return lead 188. Again, the pattern is influenced by the incoming signals as filtered by the several band pass filters to generate a series of patterns in a manner similar to that described in connection

with the preferred embodiment. The number of gas filled tubes, the type of gas filled tubes and the number of filters are a matter of choice.

Furthermore, the patterns may be altered by selecting tubes having different cut-out voltages. If, for example, one of the tubes has a low break-down voltage, a number of pulsations or alternations of the signal would show up in the pattern. By selecting another tube having extremely high break-down voltage, only a few of the pulsations or alternations will cause the tube to be energized. By selecting tubes having various gradations of break-down voltages and various gradations of cut-out voltages, it can readily be seen that the patterns generated by the several tubes will vary greatly, in spite of the fact that all are energized from the same source of energy without the use of band pass filters. Again, the patterns may be varied by the pattern control knob, increasing or decreasing the impressed voltage applied to the several gas filled tubes.

Although the device has been described as being sound responsive, the device could be used for generating patterns in response to other vibrations, as for example, mechanical vibrations, fluctuating intensities of light by means of photo-electric cells, fluctuations in color and other vibrations or impulses.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claim.

Having thus described my invention, I claim:

In a device for producing visual patterns responsive to sound, said device including a rotatable disc, means for rotating the disc, a plurality of gas filled tubes radially mounted on the disc, said gas filled tubes being so constructed and arranged as to have various gradations of break-down voltage, some having low break-down voltages, others having high break-down voltages, means for generating electrical signals responsive to sound vibrations, amplifying means for amplifying the electrical signals, means for dividing the output signals of the amplifier into band widths, and means for supplying the band widths to the gas filled tubes so as to cause each gas filled tube to be illuminated when the voltage of the impressed signal exceeds the break-down voltage of the tube to thereby generate patterns determined by the voltages of each of the band widths.

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