June 23, 1936. A. R. HOPKINS 2,045,271

VOLUME MONITORING CONTROL

Filed Nov. 15, 1932

Fig. 1

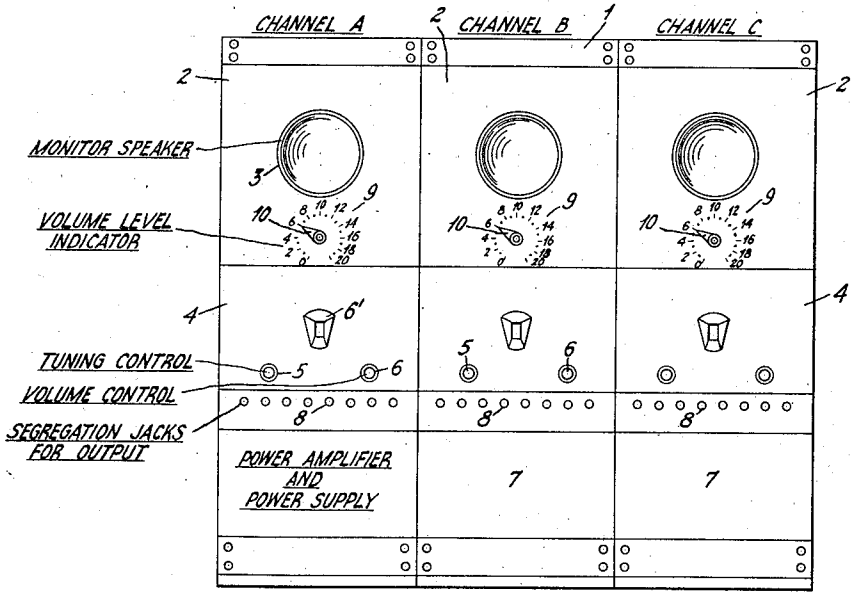


Fig. 2

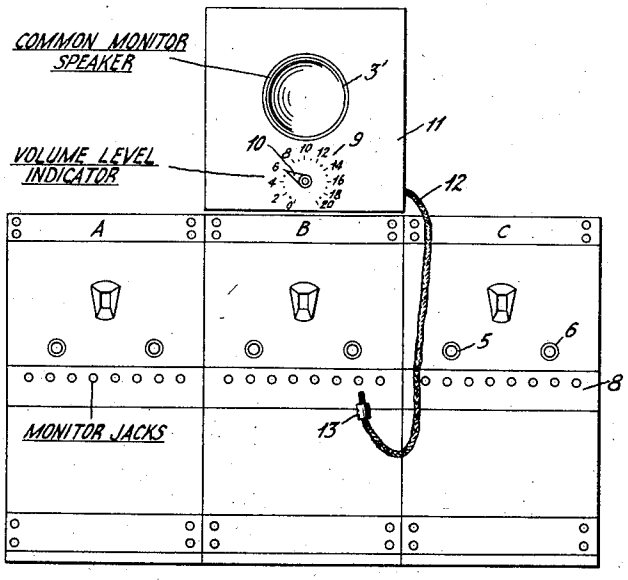
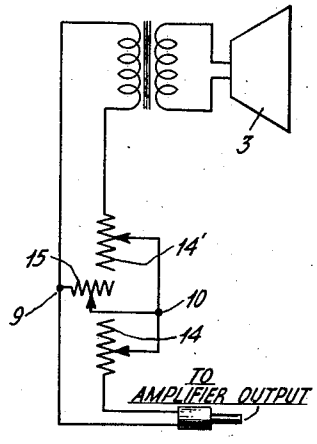


Fig. 3



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VOLUME MONITORING CONTROL

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Application November 15, 1932, Serial No. 642,711

3 Claims. (Cl. 250—20)

My present invention relates to a volume adjusting device, and more particularly to a volume level indicator for centralized radio rack equipment.

One of the main objects of the invention is to provide a volume level monitor which, when used with centralized radio rack equipment, enables the operator to adjust all channels to a substantially equal volume or to any predetermined satisfactory volume level.

Another object of the invention is to provide a device for monitoring the output level of a centralized radio channel by a visual attenuator control, the volume level of such a channel being capable of re-adjustment at any time to a selected predetermined position of the attenuator control.

Still other objects of the invention are to improve generally the efficiency of centralized radio systems, and to particularly provide volume level controls for such systems which are not only economical, durable and reliable in operation, but economically constructed and installed.

The novel features which I believe to be characteristic of my invention are set forth in particularity in the appended claims, the invention itself, however, as to both its organization and method of operation will best be understood by reference to the following description taken in connection with the drawing in which I have indicated diagrammatically several arrangements whereby my invention may be carried into effect.

In the drawing,

Fig. 1 shows in schematic manner a centralized radio rack assembly embodying the invention,

Fig. 2 shows a similar arrangement without duplication of the monitoring device, since only one monitor can be used at one time, one device is sufficient as a matter of economy.

Fig. 3 shows a circuit diagram of the invention.

Referring now to the accompanying drawing wherein like reference characters indicate similar elements in the different figures, there is shown in Fig. 1 a typical and conventional centralized radio rack assembly adapted to employ the present invention. Such an assembly is disclosed, and claimed, by Arthur F. Van Dyck in application Serial No. 491,918 filed October 29, 1930, and hence only such parts of the system as are necessary to an understanding of the present invention will be described herein. Thus, the three channel racks A, B and C, each comprise a plurality of independently removable panels 1.

Each panel of each rack supports a different device, but all horizontally aligned panels carry the same devices. The top panels 2 have monitoring speakers 3 secured thereto whereby the central station operator may constantly be able to check the output delivered from a channel rack to the distributing network (not shown to preserve simplicity of description). The panels 4 support radio receivers, either of the superheterodyne or tuned radio frequency type, and there is provided on the control face of each of these panels a tuning control 5, and a manual volume control 6. The tuning control may be of the usual and well known construction, and the volume control such as is found in present receivers. A dial 6' is also disposed on each panel 4.

The panels 7 support power amplifier stages and power supply circuits. That is, on each panel 7 is found the rectifier and filter circuits, when the equipment is used with an alternating current source, for supplying power to the circuits of the receivers on the panel 4, as well as a power amplifier connected to the output of the receiver. The panels 8 are provided with distributing network, or segregation, jacks. Those skilled in this art know that the various distributing lines may be connected to the channel racks by the jacks of panel 8, and therefore, this need not be described in any further detail.

It is obvious that the output of each channel delivered to a particular reproducer, remote from the central station, should be at a substantially uniform predetermined volume level. This is especially true where there is no volume control device located at the channel selector switch of each remote reproducer. Accordingly, there is provided a volume indicator control 9 at the rack equipment, the purpose of which is to enable the operator to adjust all channels to equal volume, or to a predetermined satisfactory volume level.

The control 9 preferably comprises, when viewed from the control face as in Fig. 1, an adjusting knob and index 10 supported on each speaker panel 2. The face of each panel 2 below the speaker 3 is provided with a plurality of attenuation indicia ranging from 0 to 20 for example. In Fig. 1 each speaker is connected to the amplifier through the attenuator, as shown in the schematic Fig. 3. In Fig. 2 a connector cable 12, terminated by a monitoring speaker plug 13, is employed for connecting the common volume level indicator to any desired channel for listening to the channel monitoring speaker 3'. Otherwise, the construction is similar.

In Fig. 3 is shown a circuit diagram of the indicator, merely by way of illustration since many

other connections could be used, and it is to be understood that the construction is adapted for use with the form of Fig. 1 or that of Fig. 2. The attenuator itself consists of three arms 14, 14', 15, the former two being in series with the line, and the arm 15 being in shunt across the line. The knob 10 is mechanically connected to the three arms so as to provide a constantly variable resistance T-pad. The attenuation of the pad is preferably linear so that it can be calibrated directly in decibels, and these attenuation figures (0 to 20 decibels) are engraved directly on the panel 11 in Fig. 2, or panels 2 in Fig. 1, about the knob 10.

One side of the resistor of arm 15 may be connected to a terminal of the monitoring speaker, while the upper end of resistor 14' may be connected to the other side of the speaker.

Assume, now, that each receiver is tuned to a different station (as it is in normal operation), and the operator desires to operate the volume level indicator to adjust all channels to a level represented by the numeral "6" of the indicator 9. All that is necessary is to set the knob 10 so that the index points to numeral "6". The volume control device 6 of channel A is, then, adjusted until the signal reproduced through speaker 3 of channel A is just audible. The accuracy of this method depends on the ability to determine this audibility level. But it is well known that this level can be fairly accurately determined and can be reset by any individual to a fair degree of accuracy. The volume control device 6 of receiver B is now adjusted until the signals reproduced through speaker 3 of channel B are just audible. The knob 10 is still at "6" of course. The same procedure is then followed for channel C.

The three channels supply, after these adjustments, the desired, predetermined volume level to the network reproducers. It will thus be seen that the present invention provides an attenuator adapted for ready use with all channels so that the outputs of each of them may be measured and controlled by a common standard. Of course, when a receiver is to be tuned, the attenuator may be set for zero, which gives maximum monitor speaker volume since increasing the dial setting of this attenuator decreases the monitor speaker volume.

In the case of Fig. 2, the plug 13 is inserted in a jack in each channel that is to be monitored. That is, as each channel is monitored, the plug is changed over to the desired panel 8.

While I have indicated and described arrangements for carrying my invention into effect, it will be apparent to one skilled in the art that my invention is by no means limited to the particular organizations shown and described, but that many modifications may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim is:

1. The method of adjusting the output volume of a radio receiver including a volume control device and having a graduated, adjustable attenuator and a sound reproducer connected to its output circuit, to a predetermined signal level which comprises the steps of adjusting said attenuator to a predetermined graduation position and adjusting said volume control device until the sound emitted from said reproducer just reaches the level of audibility.

2. Means for indicating the volume level of an audio frequency supply source comprising, a panel, a loudspeaker mounted on said panel, an adjustable attenuator mounted behind said panel, a shaft passing through said panel and connected to said adjustable attenuator, a knob and indicator secured to said shaft at the front of said panel, a plurality of indicia graduated in decibels mounted on said panel adjacent said indicator, a separable connector adapted to connect to said audio frequency source, conductive connections between said separable connector, said adjustable attenuator and said loudspeaker and a control device mounted immediately adjacent to said panel for regulating the voltage generated by said audio frequency source.

3. In combination with a plurality of radio receivers each tuned to receive a different signal frequency, a plurality of similar loudspeakers and a plurality of similar circuits connecting said loudspeakers to said respective receivers, each of said circuits including an adjustable T pad attenuator having adjustable contacts, an indicator arm connected to said contacts and a series of decibel graduations arranged adjacent each of said indicator arms, whereby the sound output pressures of two of said loudspeakers may be directly compared by noting the readings of their indicator arms.

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