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SOUND CONTROL SYSTEM

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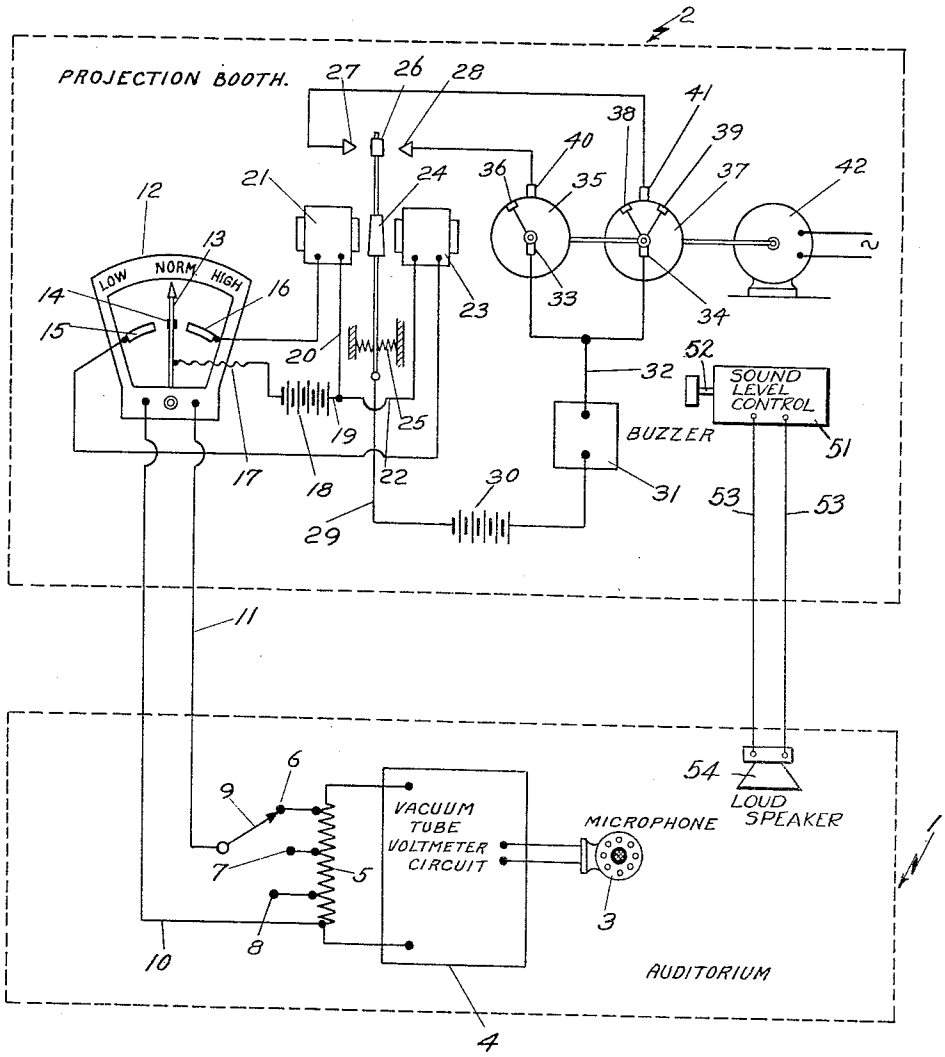


FIG. 1.

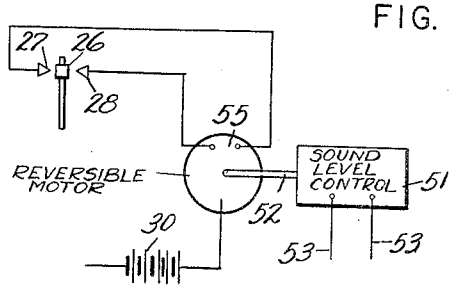


FIG. 2.

INVENTOR
Henry Schwartzberg
BY Elmer J. Gorn
ATTY.

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SOUND CONTROL SYSTEM

Henry Schwartzberg, Brookline, Mass.

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2 Claims. (Cl. 177—311)

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This invention relates to an improved sound control system for sound picture apparatus.

In systems of this type as heretofore constituted, it has been customary for an observer in the auditorium of a sound picture theatre to attempt to judge aurally the proper intensity of sound level with various sizes of the audience, and to signal the operator in the booth to either raise or lower the sound intensity until, in the opinion of the observer, the proper level was reached. The usual signal device was a buzzer located in the projection booth, and a control pushbutton in the auditorium. One buzz indicated that the sound level was too low; two buzzes indicated that the sound level was too high. In such a system the observer often is subjected to aural fatigue, thus rendering him incapable of proper judgment. Also such observers have often been prone to neglect signalling the operator except at too infrequent intervals. As a result, the sound reproduction in the usual sound theatre has often been considerably below satisfactory standards.

An object of this invention it to produce a simple inexpensive and reliable system which will relieve the auditorium observer from the necessity for exercising his aural judgment, but which will nevertheless provide the projection booth operator with continuous instructions as to how to adjust the sound projection apparatus for satisfactory auditorium reproduction.

Another object is to introduce a minimum of change in the nature of the signal reaching the operator, whereby the present system may be substituted for previous systems with a minimum burden on the operator.

The foregoing and other objects of this invention will be best understood from the following description of exemplifications thereof, reference being had to the accompanying drawing wherein:

Fig. 1 is a diagrammatic representation of a system incorporating my invention; and

Fig. 2 is a fragmentary diagram of a modification of the system shown in Fig. 1.

In the drawing, 1 represents a sound picture theatre auditorium, and 2 is the projection booth in which is located a sound level control apparatus 51, controlled by an adjusting member 52 and feeding, through a pair of leads 53, a loud speaker 54 located in the auditorium 1, whereby the operator may adjust the level of sound supplied to the auditorium. At a convenient location in the auditorium, receptive of the sound introduced therein, is located a microphone 3. The output of the microphone is fed to a suitable amplifying circuit, such as a vacuum tube voltmeter circuit device 4, the output of which is a voltage, the magnitude of which constitutes a measure of the sound level at the

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microphone. From the foregoing it is clear that the microphone and its amplifying circuit are responsive to substantially all of the audible frequencies normally contained in such sound. This output voltage is impressed across a potentiometer 5. The potentiometer is provided with a plurality of taps, preferably three in number, indicated in the drawing by the reference numerals 6, 7 and 8. An adjustable contact arm 9 is adapted to be moved into engagement with any one of said taps by the auditorium observer. Tap 6 represents the tap on which the arm 9 is set when the auditorium is one-third full, tap 7 is contacted when the auditorium is two-thirds full, and tap 8 is contacted when the auditorium is full. Thus as the auditorium audience increases, a smaller proportion of the output voltage from the voltmeter circuit device is impressed between the arm 9 and a conductor 10 connected to the opposite end of the potentiometer 5.

The conductor 10 and a conductor 11 connected to the arm 9 feed the selected portion of the voltage from the potentiometer 5 to a voltmeter 12. The voltmeter 12 is provided with an indicating needle 13 which when it is in its central position indicates a satisfactory normal sound level. If, however, the voltage supplied to it falls below normal, the needle 13 moves to the left and indicates that the sound level is too low. Likewise, if the voltage rises above normal, the needle moves to the right and indicates that the sound level is too high. The meter 12 in itself provides a constant visual indication to the operator as to the conditions of sound level in the auditorium as adjusted to the size of the audience.

The voltmeter needle 13 also carries a contact 14 which engages an arcuate contact 15 in the "low" position of the needle and an arcuate contact 16 in the "high" position of the needle. The meter 12 is preferably damped so as to respond only to relatively slow variations in voltage, thus avoiding a response to transient variations in sound not requiring a resetting of the general sound level. Suitable delay may also be incorporated in the device 4 for the same purpose. The contact 14 is connected by a conductor 17 to one side of a suitable source of current, such as a battery 18. The other side of the battery is connected to a common connection 19 having one branch 20 connected to one terminal of an actuating electromagnet 21, and having another branch 22 connected to one terminal of another actuating electromagnet 23. The contact 15 is connected to the other terminal of the electromagnet 23, and the contact 16 is connected to the other terminal of the electromagnet 21. The electromagnets 21 and 23 actuate the armature 24 which, when both electro-

magnets are deenergized, is maintained in a central position by a biasing spring 25.

The armature 24 carries a contact arm 26 which is adapted to engage a stationary contact 27 when electromagnet 21 is energized, and a stationary contact 28 when electromagnet 23 is energized. The contact arm 26 is also connected by means of a conductor 29 to one terminal of a suitable source of power, such as a battery 30.

The other side of the battery is connected to one terminal of a signalling device, such as a buzzer 31. The other terminal of the buzzer is connected to a conductor 32, one branch of which is connected to a brush 33 and another branch of which is connected to a brush 34. The brush 33 engages the slip ring of a commutator 35 having a rotating contact 36. The brush 34 engages the slip ring of a commutator 37 having two rotating contacts 38 and 39 adjacent each other on said commutator. A stationary brush 40 is adapted to engage the commutator 35, and a stationary brush 41 is adapted to engage the commutator 37. Brush 40 is connected to contact 28, and brush 41 is connected to contact 27.

The commutators 35 and 37 are driven by a motor drive 42, such as a simple clock motor mechanism, which imparts a relatively slow rotation to the commutators, such as one revolution each two seconds. The motor drive 42 may be energized from a suitable source of alternating current.

When initially installed, the system is so designed and adjusted that, with the auditorium one-third full and with the arm 9 set on the tap 6, a proper level of sound at the microphone 3 will cause the needle 13 to assume its normal or central position. The tap 7 is so located that, with the arm 9 set on it, the sound level which causes the needle 13 to assume its central position is sufficiently higher to be proper for the auditorium two-thirds full. Likewise, the tap 8 is so located that, with the arm 9 set on it, the sound level which causes the needle 13 to assume its central position is sufficiently higher to be proper for the auditorium filled with an audience.

During operation, the auditorium observer notes whether the auditorium is one-third, two-thirds or completely full. He then sets the arm 9 on the corresponding tap on the potentiometer 5. If the sound level is proper, the needle 13 will be in its central position, and no signal will be conveyed to the operator by the buzzer 31. If, however, the sound level falls too low, the contact 14 will engage the contact 15. This will energize the electromagnet 23, which will cause the contact 26 to engage the contact 28. This will connect the commutator 35 into the circuit of the battery 30, and the buzzer 31 will be energized to produce a series of single buzzes. The desired rate of repetition of these buzzes can be secured by proper selection of the speed of rotation of the motor drive 42. The single buzz will inform the operator that the sound level is too low, whereupon he will make the proper adjustments to raise the auditorium sound level until the buzzer 31 stops. If the sound level rises too high, the contact 14 will engage the contact 16 which will energize the electromagnet 21 to cause the contact 26 to engage the contact 27. This will connect the commutator 37 into the circuit of the battery 30, and thus the buzzer 31 will be energized to produce a series of double buzzes. This will inform the operator that the sound level is too high, and he will then lower the sound until the double buzzes cease.

By the above arrangement the objects of this invention are accomplished in a simple yet effective manner. Of course it is to be understood that this invention is not limited to the particular details as described above as many equivalents will suggest themselves to those skilled in the art. For example, other means than a potentiometer may be used to select the various sound levels. Also other degrees of audience size may be selected as those at which the adjustments by the auditorium observer are to be made. The signalling system in the booth could be varied as by utilizing other types of signals, such as visual signals. Likewise, instead of causing the sound level to be adjusted through the medium of an operator in the booth, the signal current from the auditorium station could be utilized to automatically raise or lower the sound level, as shown in Fig. 2. In this embodiment the contacts 27 and 28 control a reversible motor 55 which drives the member 52 and this raises or lowers the sound level dependent on the direction of rotation of the motor 55. Other equivalents will suggest themselves to those skilled in the art. It is accordingly desired that the appended claims be given a broad interpretation commensurate with the invention within the art.

What is claimed is:

1. A sound control system comprising a moving picture theatre including an auditorium and a projection booth, a microphone device in said auditorium generating a voltage which is a measure of the sound level in said auditorium, signal means in said booth, means for supplying said voltage to said signal means, said signal means being responsive to voltage below a predetermined normal value of said voltage to produce a single audible signal and responsive to voltages above said predetermined value to produce two sequential audible signals.

2. A sound control system comprising a moving picture theatre including an auditorium and a projection booth, a microphone device in said auditorium generating a voltage which is a measure of the sound level in said auditorium, signal means in said booth, means for supplying said voltage to said signal means, said signal means being responsive to voltages below a predetermined normal value of said voltage to produce a single audible signal and responsive to voltages above said predetermined value to produce two sequential audible signals, and means for adjusting the ratio of said voltage to the intensity of sound in said auditorium.

HENRY SCHWARTZBERG.

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