

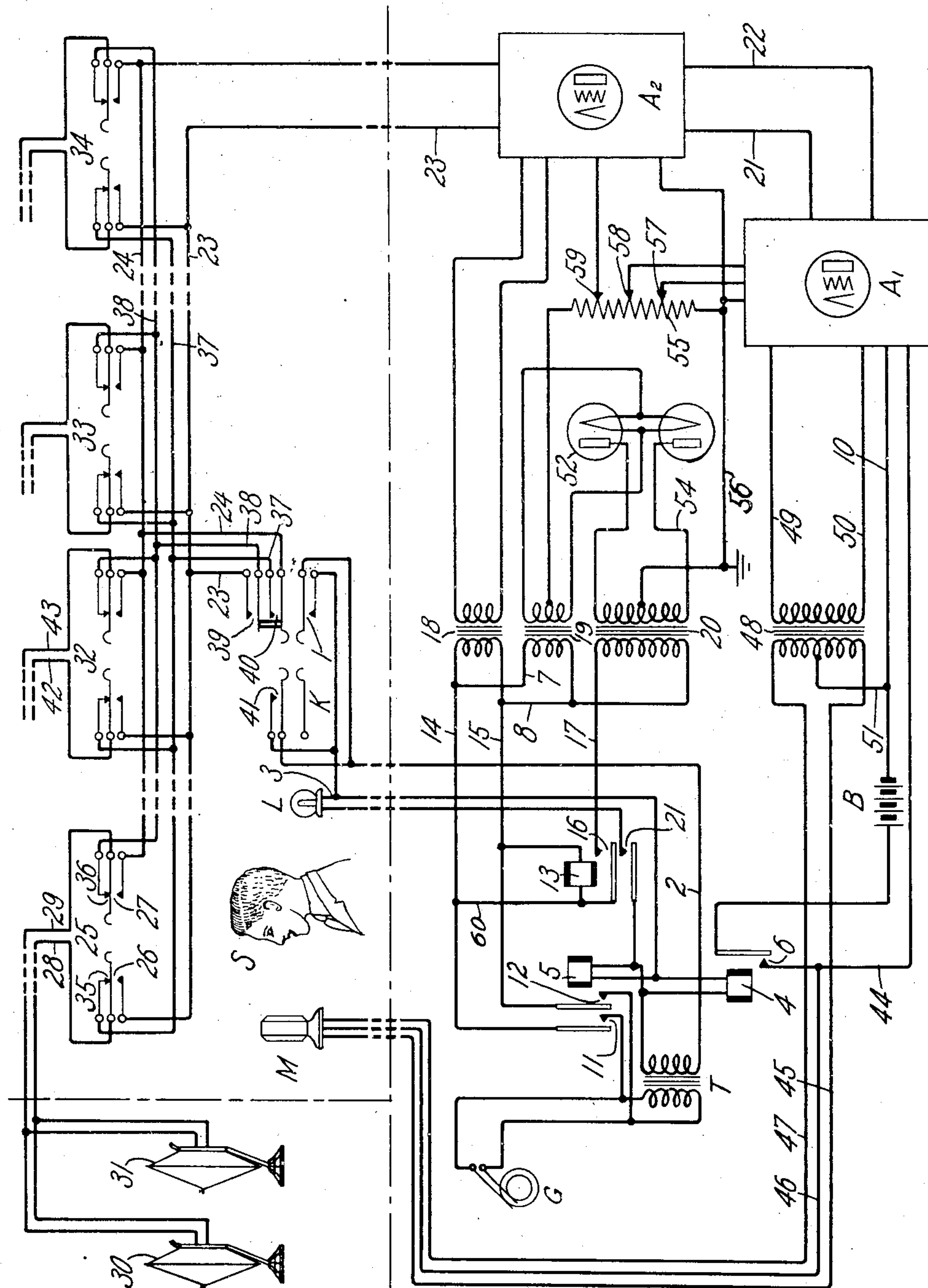
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PUBLIC ADDRESS SYSTEM

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PUBLIC-ADDRESS SYSTEM.

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This invention relates to switching systems and is particularly applicable to signaling, general announcing, and public address systems.

5 In such systems it frequently becomes desirable to connect all of the loud speakers or other signaling devices in circuit at one time for various purposes such as the making of general announcements. Heretofore 10 it has been possible to accomplish this result only by the use of elaborate and expensive relay systems. It is the object of this invention to provide a cheap, simple and unitary switching means whereby such a 15 switching operation may be accomplished by the actuation of one switch key, regardless of the position of the individual circuit controls.

20 In accordance with the general features of this invention each individual or group circuit key is provided with back contacts connected to a common bus. A double throw master key in its normal position permits the group circuits to be controlled 25 individually but when thrown in the emergency position it brings into circuit through the medium of the common bus any and all of the speakers not already in circuit.

30 Another feature of this invention is means under the control of the master key for preventing clicks in the loud speakers due to interruptions of the transmitter current.

35 Both of these features are illustrated in the embodiment of this invention shown on the accompanying drawing. This switching system is considerably simplified by the use of diagrammatic symbols for certain apparatus which in itself forms no part of the present invention, for instance, a rectangle 40 containing the letter A is used to denote a complete vacuum tube amplifier. Only a few group circuit switches are shown but this number obviously could be increased to meet the requirements of any particular installation. 45

50 As indicated by the disposition of the apparatus in the drawing, the switching keys and the microphone are arranged to be located in one place and the amplifiers, relays, etc. in another. This remote control feature is often of considerable importance as, for instance, when the system is used in hospitals or other institutions, and placed under the control of some one person such

as the local telephone operator. In these 55 installations the switching keys would be compactly arranged within the reach of the operator while the amplifiers, batteries, etc. would be placed in the basement or any other suitable place. The number and loca- 60 tion of the various individual loud speakers will of course depend upon the size and nature of the particular institution wherein the system is used. In general, however, the several speakers necessary for one large 65 room, or for a number of rooms used for similar purposes, may be connected to one group switch and operated as a unit. In other cases it may be desirable to provide 70 separate keys for a number of individual loud speakers.

When it is desired to put the system into operating condition the master key K is moved to its downward or normal operating position. Contact 1 of this key completes 75 the secondary circuit of a supply transformer T which is used to transform the 110 volt alternating current supplied from source G to a lower voltage suitable for relay operation such as 24 volts. Current 80 from the secondary winding of transformer T traverses conductor 2, contact 1, conductor 3, windings of relays 4 and 5 in parallel to transformer again and actuates the relays.

The operation of relay 4 closes contact 6 85 which completes circuits for the microphone M and the filaments of amplifier A¹. The microphone is of the push-pull type with conductors 45 and 47 permanently connected to the speech input transformer 48. When 90 contact 6 closes, battery is supplied to the speech circuit over conductors 51, 9 and 46 and to the filaments over conductors 10, 9 and 44.

In closing, contacts 11 and 12 of relay 5 95 impress 110 volts alternating current upon conductors 14 and 15 leading to filament transformer 18 of amplifier A² and energizes a slow acting relay 13. Filament transformer 19 of rectifier 52 is also energized 100 over conductors 7 and 8.

After a delay of several seconds slow acting relay 13 closes its contacts and completes the circuit to the plate voltage supply transformer 20 of amplifiers A¹ and A² from 105 conductors 14 and 15 over conductors 8, 60 and 17. This delay is necessary to protect the tubes from the damage that would prob-

ably result if plate voltages were applied to them before their filaments had become properly heated.

The secondary of transformer 20 is connected by conductors 53 and 54 to a full wave rectifier 52 which is arranged to impress its high voltage direct current output across the potentiometer 55. Proper plate voltages are obtained by tapping potentiometer 55 at points 57, 58 and 59.

It should be noted that both the filament and plate circuits of the amplifiers A^1 and A^2 have been closed so that the system is now ready for operation. This information is conveyed to the operator by the glowing of indicating lamp L which is lighted by the closing of contact 21 of relay 13. If the operator then desires to page some person believed to be in the neighborhood of the loud speakers controlled by key 25, for instance, he will actuate that key to close its contacts 26 and 27. He will then address the message to the microphone M and the voice currents will be delivered to the preliminary amplifier A^1 over the circuit previously traced, amplified and impressed upon final amplifier A^2 over conductors 21 and 22 for further amplification in the well known manner. The output of the final amplifier will then actuate the loud speakers 30 and 31 previously selected over a circuit comprising conductors 23 and 24, contacts 26 and 27 and conductors 28 and 29. In a similar manner any other group circuit or single speaker could be operated by actuating the proper key such as 32, 33 or 34.

Sometimes it may be desirable to make a general announcement or to send out an alarm. When the number of group circuits is large it would involve considerable effort and delay to deliver the message to each circuit separately, accordingly the master key K is arranged to connect all of the loud speakers in circuit at one time when thrown to its emergency or upward position. Normally closed back contacts of each group switch key, such as contacts 35 and 36 of key 25 are connected to a common bus consisting of conductors 37 and 38 which terminate on the emergency side of master key K. When the key is thrown to the emergency position the output of amplifier A^2 actuates all loud speakers over a circuit extending from the amplifier over conductors 23 and 24, contacts 39 and 40 of key K, common buses 37 and 38, back contacts of each group key, conductors 28 and 29, 42 and 43, etc. to each loud speaker. If at the time such a general announcement is made one or more of the group keys have been left in the operated position the corresponding

speakers will nevertheless be operated simultaneously with the others over the normal circuit including conductors 23 and 24.

When the system is not required for immediate use it may be rendered inoperative and completely deenergized by simply returning the master key to its neutral or off position. When this is done the secondary circuit of supply transformer T is broken at contact 1 or 41 depending upon the position in which the key was last set. Indicating lamp L is thereupon extinguished and relays 4 and 5 are deenergized. In opening, contacts 11 and 12 of relay 5 disconnect filament supply transformers 18 and 19 and plate supply transformer 20, and release relay 13.

Relay 4 is slow in releasing so that contact 6 is not broken until 5 to 10 seconds after the plate voltage supply transformer is deenergized. This delay in opening of the transmitter circuit until after the plate circuits are deenergized prevents the click, produced when the battery current is interrupted, from being heard in the loud speakers.

A particular application of the features in this invention has been described by way of illustration. It is not intended, however, to limit the invention by this illustration but only according to the scope of the appended claims.

What is claimed is:

1. In a public address system, a speech input circuit, a speech output circuit, a plurality of loud speaking devices, switching means individual to said devices, other switching means arranged to connect in said output circuit all of said devices simultaneously regardless of the position of said individual switching means, and means responsive to said other switching means for maintaining said input circuit until after said output circuit has been opened.

2. In a public address system, a speech input circuit, a speech output circuit, a plurality of loud speaking devices, switching means individual to the devices, other switching means arranged to connect in the output circuit all of the devices simultaneously, regardless of the position of the individual switching means, and a slow releasing relay under the control of the said other switching means for maintaining the input circuit until the output circuit has been opened.

In witness whereof, I hereunto subscribe my name this 22 day of November, A. D. 1927.

LAWRENCE E. MELHUSH.