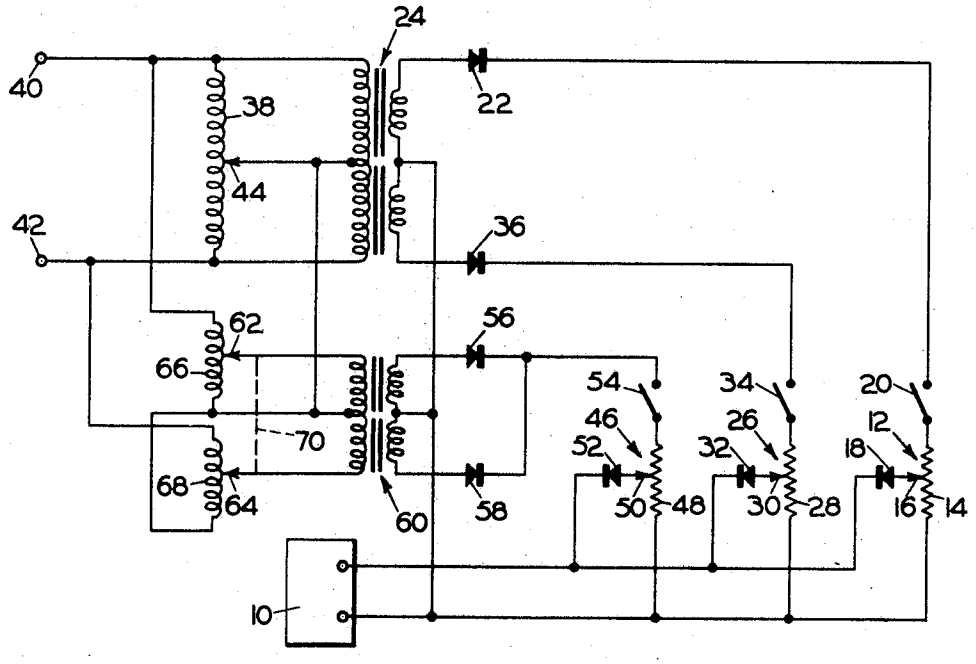
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DIMMER CONTROL FOR THEATRICAL LIGHTING SYSTEMS

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# DIMMER CONTROL FOR THEATRICAL LIGHTING SYSTEMS

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## ABSTRACT OF THE DISCLOSURE

A voltage-controlled light dimmer is connected through a pair of preset fader control potentiometers and blocking diodes to opposite ends of the center tapper secondary of a low voltage transformer, the center-tapped primary of which is connected to a first autotransformer. The dimmer also is connected through a third potentiometer and a pair of blocking diodes to opposite ends of the center tapped secondary of another low voltage transformer, the center-tapped primary of which is connected to a second autotransformer. The primary of the first autotransformer has a variable center tap connected to a fixed center tap on the second autotransformer which also has a pair of variable taps one on each side of its fixed center tap. The pair of variable taps are ganged together for simultaneous movement in the same direction relative to the associated fixed center tap.

## BACKGROUND OF THE INVENTION

This invention relates to theatrical lighting systems, and more particularly to a novel electric control circuit for voltage-controlled theatrical light dimmers.

In theatrical lighting systems wherein the intensity of each light bank is adjusted by a voltage-controlled dimmer, master and fader control circuits are employed to adjust the voltage to the dimmer. However, prior circuits for this purpose do not permit the use of master and fader controls simultaneously, nor do they accommodate switching smoothly between master and fader controls. These limitations impose severe restrictions on the use and versatility of such control circuitry.

## SUMMARY OF THE INVENTION

In its basic concept, the dimmer control circuit of the present invention utilizes a pair of autotransformers connected in parallel and arranged for independent adjustment, one as a master control and the other as a fader control. The output voltages from these autotransformers are adapted to be connected selectively or simultaneously to a voltage controlled light dimmer.

It is by virtue of the foregoing basic concept that the primary objective of the present invention is achieved, namely to overcome the disadvantages and limitations of prior dimmer controls, as enumerated hereinbefore.

Another important object of the present invention is the provision of a dimmer control circuit of the class described which is of simplified construction for economical manufacture, which is capable of use in a variety of theatrical electronic lighting systems, and which is capable of long service life with a minimum of maintenance.

The foregoing and other objects and advantages of this invention will appear from the following detailed description, taken in connection with the accompanying drawing of the preferred embodiment.

## BRIEF DESCRIPTION OF THE DRAWING

The single figure is a schematic electrical diagram of a dimmer control circuit embodying the features of the present invention.



## DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawing there is illustrated in block form a voltage-controlled light dimmer **10** which, as is well known, functions to control the intensity of a plurality of electric lamps in a bank forming a part of a theatrical lighting system. The dimmer may be of any conventional type, such as a mangetic amplifier, a silicon-controlled rectifier, or other type which is controlled by a low voltage, low current preset control system. In the embodiment illustrated, there are three preset controls. The "Fader Down" control **12** includes the variable potentiometer **14** one end of which is connected to one input terminal of the dimmer and the variable tap **16** of which is connected through the blocking diode **18** to the other input terminal of the dimmer. The opposite end of the potentiometer is connected through the control switch **20** and the blocking diode **22** to one end of the center-tapped secondary winding of the low voltage transformer **24**. The "Fader Up" control **26** includes the variable potentiometer **28** one end of which is connected to the one dimmer input terminal and the variable tap **30** of which is connected through the blocking diode **32** to the other input terminal. The opposite end of the potentiometer is connected through the control switch **34** and the blocking diode **36** to the opposite end of the secondary winding of transformer **24**.

The opposite ends of the center-tapped primary winding of the low voltage transformer **24** are connected to the opposite ends of the autotransformer winding **38** which, in turn, are connected across the terminals **40** and **42** of an alternating current supply. The autotransformer winding has a variable tap **44** which is connected to the center tap of the primary winding of low voltage transformer **24**. Thus, assuming that the terminal **40** is the high voltage terminal, movement of the variable tap toward the upper end of the autotransformer winding decreases the voltage in the upper half of the low voltage transformer and correspondingly increases the voltage in the lower half thereof. Accordingly, the voltage to the "Fader Down" preset control **12** is reduced and the voltage to the "Fader Up" preset control **26** is increased. This result is reversed when the variable tap **44** is moved toward the lower end of the autotransformer winding, as will be apparent.

A master preset control **46** also is provided. It includes the variable potentiometer **48** one end of which is connected to the one dimmer input terminal and the variable contact **50** of which is connected through the blocking diode **52** to the other dimmer input termianl. The opposite end of the potentiometer is connected through the control switch **54** and the pair of blocking diodes **56** and **58** to the opposite ends of the center-tapped secondary winding of the low voltage transformer **60**. The opposite ends of the center-tapped primary winding of this transformer are connected to the variable taps **62** and **64** associated with the autotransformer windings **66** and **68**, respectively.

The windings **66** and **68** actually constitute a single, center-tapped winding the opposite ends of which are connected across the input terminals **40** and **42**. The arrangement of windings illustrated in the drawing is merely a convenience to more clearly illustrate that the pair of variable taps **62** and **64** are connected together mechanically, as indicated by the dash line **70**, to move simultaneously in the same direction relative to the center tap.

In a typical installation, the high voltage terminals **40** and **42** are connected to an alternating current source of 120 volts, the low voltage transformers **24** and **60** provide an alternating current output at their secondaries of 24 volts, and the blocking diodes **22**, **36**, **56** and **58** rectify this low voltage alternating current to 12 volts half-wave direct current. The blocking diodes **18**, **32** and **52** func-

tion to prevent spurious voltage feedback from one preset control to another.

With the variable tap **44** of the fader autotransformer **38** moved to its upwardmost position, the entire 120 volt supply is applied to the bottom half of low voltage transformer **24**, and also to the bottom half of low voltage transformer **60**, whereby to supply 12 volts half-wave direct current to the "Fader Up" preset control **26**, as well as 12 volts half-wave direct current from the blocking diode **58** to the master preset control **46**. With the variable tap **44** moved to its downwardmost position, the full 120 volts supply is applied to the upper half of low voltage transformer **24** and to the upper half of low voltage transformer **60**, whereby to provide 12 volts half-wave direct current to the "Fader Down" preset control **14**, as well as 12 volts half-wave direct current through the blocking diode **56** to the master preset control **46**.

An intermediate settings of the variable tap **44** of the fader autotransformer, proportionate shares of the alternating current supply voltage are applied to the upper and lower portions of the low voltage transformers. Accordingly, proportionate shares of the 12 volts half-wave direct current from the blocking diodes are supplied to the fader and master preset controls.

The master control may be utilized independently of or in conjunction with the fader control. Adjustment of the ganged pair of variable taps **62** and **64** simultaneously away from the associated center tap serves to increase the output from the diodes **56** and **58** toward the maximum of 12 volts, while movement of the ganged taps simultaneously toward the fixed center tap functions to reduce this output toward zero. If the master control is used simultaneously with the fader control, the voltage to the dimmer **10** is the algebraic sum of the voltages from the preset controls. In the present illustration, this can never be more than 12 volts. It will be understood that the preset controls also may be adjusted as desired, up to the highest setting of the fader and master controls.

Thus it will be appreciated that the present invention provides simplified and economical means, capable of use with theatrical electronic lighting systems of diverse types, by which to achieve maximum versatility of lighting control.

It will be apparent to those skilled in the art that various changes in the number, type and arrangement of parts described hereinbefore may be made without departing from the spirit of this invention.

Having now described my invention and the manner in which it may be used, I claim:

**1.** In a theatrical lighting system including a voltage controlled light dimmer, a dimmer control circuit comprising

(a) fader control autotransformer means having a primary connectable across a source of electrical potential and a variable secondary connectable to the input of the light dimmer, said variable secondary including a variable tap, and

(b) master control autotransformer means having a primary connectable across the source of electric potential and having a fixed center tap connected to the variable tap of the fader control autotransformer secondary,

(c) the master control autotransformer means having a pair of variable secondaries including a pair of variable taps movable simultaneously in the same direction relative to the associated fixed center tap, said variable secondaries being connectable to the input of the light dimmer.



**2.** The dimmer control circuit of claim **1** including a low voltage transformer having center-tapped primary and secondary windings, the ends and center tap of the low transformer primary winding being connected to the ends and variable tap, respectively, of the fader autotransformer means.

**3.** The dimmer control circuit of claim **2** including current rectifier means connecting the ends of the low voltage transformer secondary winding to the input of the light dimmer.

**4.** The dimmer control circuit of claim **3** including variable resistance preset control means interposed between the rectifier means and dimmer input.

**5.** The dimmer control circuit of claim **1** including a low voltage transformer having center-tapped primary and secondary windings, the ends of the low voltage transformer primary winding being connected one to each of the pair of variable taps of the master autotransformer means and the center tap of said primary being connected to the center tap of the master autotransformer means.

**6.** The dimmer control circuit of claim **5** including current rectifier means connecting the ends of the low voltage transformer secondary winding to the input of the light dimmer.

**7.** The dimmer control circuit of claim **6** including variable resistance preset control means interposed between the rectifier means and dimmer input.

**8.** The dimmer control circuit of claim **1** including

(a) a first low voltage transformer having center-tapped primary and secondary windings, the ends and center tap of the first low voltage transformer primary winding being connected to the ends and variable tap, respectively, of the fader autotransformer means, and

(b) a second low voltage transformer having center-tapped primary and secondary windings, the ends of the second low voltage transformer primary winding being connected one to each of the pair of variable taps of the master autotransformer means and the center tap of said primary being connected to the center tap of the master autotransformer means.

**9.** The dimmer control circuit of claim **8** including current rectifier means connecting the ends of the first and second low voltage transformer secondaries to the input of the light dimmer.

**10.** The dimmer control circuit of claim **9** including variable resistance preset control means interposed between the rectifier means and dimmer input.


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