(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 247 529 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **87107430.8**

(22) Date of filing: **22.05.87**

(51) Int. Cl.⁴: **H 05 B 41/392**, H 05 B 41/29

(30) Priority: **26.05.86 KR 408986**

(43) Date of publication of application: **02.12.87 Bulletin 87/49**

(84) Designated Contracting States: **DE ES FR GB IT**

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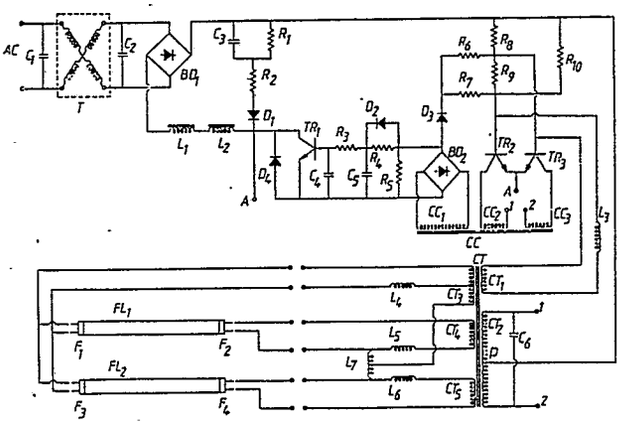
(54) An electronic ballast stabilizer.

(57) An electronic ballast stabilizer for a florescent lamp comprises a noise reduction transformer and capacitors, a bridge rectifying circuit, a noise reduction circuit, two switching transistors, voltage regulating coils, a constant current transistor, a center tap and a chopper transformer. A fine low frequency voltage wave is oscillated from the chopper transformer and simultaneously an automatic oscillated sound is biased so that the lamp is turned on under low current and the wavelength is constant.



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Field of Invention

The present invention relates to an electronic ballast stabilizer for a florescent lamp, and especially, to an electronic ballast stabilizer for a florescent lamp wherein an input source which is AC voltage is applied to a noise reduction transformer to reduce noise, the voltage being regulated, the regulated voltage being rectified by a bridge rectifying circuit and then applied to a voltage regulating coil, plus voltage being applied to a noise reduction circuit so voltage drop can be made whereas minus voltage is applied to a constant current transistor so that one of two switching transistors is alternatively operated, a low frequency oscillating output being derived from a chopper coil and amplified at a chopper transformer and then applied to both filaments of the florescent lamp, thereby low current being applied to the florescent lamp so that the florescent lamp can be stably turned on and the efficiency largely increased.

Background of Invention

Up to now, the florescent lamp is widely used because it requires less electric power than an incandescent electric lamp and its light is like sunshine. But, it adopts the magnetic preheating manner which is not deviated from underdeveloped

principle so the efficiency of function is low. In the meantime, when the florescent lamp cannot respond to voltage change, etc., the inner part of the ballast stabilizer gets damaged due to superheating so its lifetime is shortened. Also, when a starter lamp is not good, black spots are created at both end portions of the florescent lamp and if the heater of the florescent lamp is cut, the florescent lamp cannot be used further. Especially, in a high frequency generating type florescent lamp or an electronic type florescent lamp, the electric wave disturbance is caused so wavelength is not constant, thereby visual disturbance may be created. Also, if a light wave is created, it has a bad influence on the human body.

Summany of Invention

In order to eliminate the above mentioned defects, the purpose of the present invention is to provide an electronic ballast stabilizer for a florescent lamp wherein AC input voltage is applied to a noise reduction transformer for reducing noise, the voltage being regulated, the regulated voltage being applied to a bridge rectifying circuit so the voltage is changed to DC voltage, DC voltage passing through a voltage regulating coil, plus voltage passing through a voltage drop and noise reduction circuit whereas minus voltage passes through a constant current transistor so that one of two switching transistors

is alternatively operated, low frequency oscillating being carried out at a chopper coil and the wavelength thereof being applied to the primary coil of the chopper transformer and amplified at the secondary coil, the amplified wave being applied to both filaments of the florescent lamp, thereby low current being applied to the florescent lamp. Therefore, the florescent lamp can be stably turned on and the electronic ballast stabilizer for the florescent lamp can be operated in higher efficiency.

The detailed description of the present invention may be had by referring to the accompanying drawing.

The accompanying drawing illustrates the circuit diagram of the invention.

Detailed description

AC input voltage is applied to a noise reduction transformer T and it passes through two regulating capacitors C1 and C2 to a bridge rectifying circuit BD1. Plus voltage is applied to the parallel connection of the resistor R1 and capacitor C3 which is the noise reduction circuit at the time of voltage drop, and it passes through a resistor R1 and a diode D1. Thereafter, plus voltage is coupled to the emitters of two switching transistors TR2 and TR3. At the same time, it passes through the resistors R8 and R9 to the bases of the switching transistors TR2 and TR3. In the meantime, minus voltage passes through voltage

regulating coils L1 and L2 to the collector of constant current transistor TR1, and it is applied to the serial and parallel connection of the resistors R3, R4 and R5, the capacitors C4 and C5 and a diode D2. Therefore, the minus voltage is coupled to the bridge rectifying circuit BD2 and passes from the bridge rectifying circuit BD2 coupled to the primary coil CC1 of the chopper coil CC into a diode D3 and resistors R6 and R7. Also, it is coupled to the bases of two switching transistors TR2 and TR3, which bases are connected through the first coil CT1 and the coil L3 in feedback manner.

The plus voltage is applied to a center tap P. Both ends of the primary coil CT2 of the chopper transformer CT, to which a charge and discharge capacitor C6 is connected between, are coupled respectively to the collectors of the switching transistors TR2 and TR3 through the primary coils CC2 and CC3 of the chopper coil CC. The secondary coil CT3 of the chopper transformer CT is coupled to the filaments F1 and F3 of two florescent lamps FL1 and FL2 through a noise reduction coil L4. At the same time, a coil L7 is connected between the secondary coils CT4 and CT5 of the chopper transformer CT, which are coupled to the filaments F2 and F4 of florescent lamps FL1 and FL2 through the noise reduction coils L5 and L6, respectively.

The present invention above mentioned functions to reduce noise of AC input voltage which is inputted to the noise reduction

transformer T so the voltage change having an allowance range of about 20 V is automatically regulated. The regulated voltage is changed into DC voltage by a bridge rectifying circuit BD1, and it passes through the voltage regulating coils L1 and L2. At that time, in case that an input voltage is 100 V, it is applied only to the coil L1 or in case that an input voltage is 220 V, two coils can be simultaneously operated.

When plus voltage is dropped, the voltage drop is made at the resistor R1 and the capacitor C3 of which the noise reduction circuit consists. If the noise is reduced and voltage drop is rapidly carried out, bias voltage is applied to the emitters of two switching transistors TR2 and TR3 through the resistor R2 and the diode D1 by the difference of voltage between the resistor R1 and the capacitor C3. Minus voltage is applied to the constant current transistor TR1, and it passes through the capacitors C4 and C5, resistors R3, R4, R5 and a diode D2 connected in series and parallel between the base and the emitter of transistor TR1 and it is regulated so that the current is constant. The regulated voltage passes through the bridge rectifying circuit BD2 coupled to the primary coil CC1 of chopper coil CC and through the voltage regulating diode D3. Two switching transistors TR2 and TR3 are aternatively operated. The bases of the switching transistors are coupled to the resistors R6, R7, R8 and R9 which have different resistance

values, respectively. As a result, a low frequency wave passes from the center tap P of the first coil CT2 of chopper transformer CT to the primary coil CT2 so the capacitor C6 is charged. At the same time, it passes through the primary coil CC2 of chopper coil CC and the collector-emitter conducting path of switching transistor TR2 and it passes from the primary coil CT2 of chopper transformer CT to the primary coil CC3 of chopper coil CC and passes through the collector-emitter conducting path of switching transistor TR3. These operations are repeated so a fine low frequency voltage wave is oscillated from the primary coils CC2 and CC3 of chopper coil CC by means of the low frequency oscillating output derived from two switching transistors TR2 and TR3. The automatic oscillated sound is biased at the coil L3 feedback coupled to the bases of two switching transistors TR2 and TR3. In the meantime, the automatic oscillated sound is applied from the coil L3 to the primary coil CT1 of chopper transformer CT. The fine low frequency wave derived from the switching transistors TR2 and TR3 is applied to the primary coil CT2 of chopper transformer CT. The wave is largely amplified at the chopper transformer CT. The low voltage is applied to the filaments F1 and F3 of the florescent lamps FL1 and FL2 connected with the secondary coil CT3 and the other filaments F2 and F4 of the florescent lamps FL1 and FL2 connected with the secondary coils CT4 and CT5 so a

stable lighting is ensured and the wavelength of light is constant. In such as low frequency wave oscillating manner, the oscillated noise derived from the second coils CT3, CT4 and CT5 of chopper transformer CT is reduced by such coils L4, L5 and L6 so stable lighting conditions can be always ensured. Therefore, in case that one florescent lamp is used, a coil L7 connected between the secondary coils of chopper transformer CT can be regulated.

After passing through the noise reduction transformer T and the bridge rectifying circuit BD1, plus voltage passes through the noise reduction circuit at the time of voltage drop and is applied to the bases of switching transistors TR2 and TR3 whereas minus voltage passes the constant current transistor TR1 and the bridge rectifying circuit BD2 and is applied to the bases of switching transistors TR1 and TR2. Therefore, one of two switching transistors TR2 and TR3 is alternatively turned on so a low frequency oscillating output is created. As a result, a fine low frequency voltage wave is oscillated from the chopper transformer CT. At the same time, an automatic oscillated sound is biased so the lamp is turned on under low current and the wavelength is constant. Therefore, there is no influence on eyesight of humans because the intensity of light is always constant. Also, the consumption of electric power is small and the noise is perfectly eliminated and the black spot does not

occur at both ends of florescent lamp. In the meantime, one or two florescent lamps can be used at the condition of 100 V combined 220 V.

Claim

1. An electronic ballast stabilizer comprising :

a noise reduction transformer(T) and capacitors(C1, C2) for regulating AC input voltage,

a bridge rectifying circuit(BD1) in which the AC input voltage is changed into DC voltage,

a noise reduction circuit comprising a resistor(R1) and a capacitor(C3) which plus voltage passes through at the time of voltage drop,

a resistor(R2) and a diode(D1) which the plus voltage passes through,

two switching transistors(TR2, TR3) in which the plus voltage is applied to their emitters,

resistors(R8, R9) which the plus voltage passes through and is applied to their bases,

voltage regulating coils(L1, L2) which minus voltage passes through,

a constant current transistor(TR1) in which the minus voltage is applied to its collector,

a series and parallel circuit comprising resistors(R3, R4, R5) located between the base and emitter of said transistor (TR1), capacitors(C4, C5) and diode(D2) in which the minus voltage passes through,

a bridge rectifying circuit(BD2) coupled to the coil(CC1) of chopper coil(CC) in which the minus voltage passes through, a diode(D3) and resistors(R5, R7) which the minus voltage passes through,

the bases of switching transistors(TR2, TR3) feedback connected through the primary coil(CT1) of the chopper transformer(CT) and coil(L3) to which minus voltage is applied,

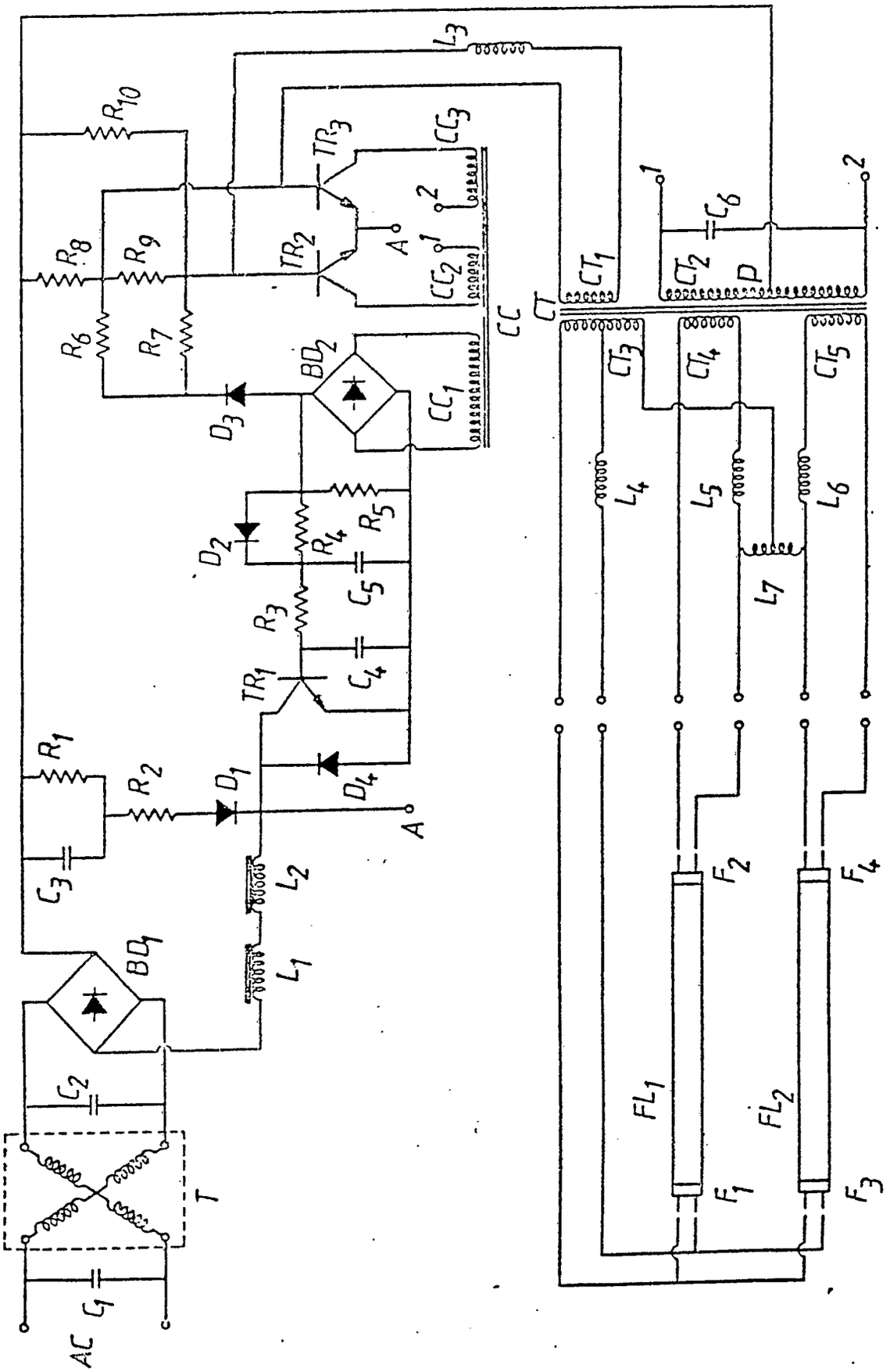
a center tap(P) which the plus voltage is applied to,

the primary coil(CT2) of chopper transformer(CT) having a charge and discharge capacitor(C6) at the center in which its ends are connected to the collectors of switching transistors(TR2, TR3) through the primary coils(CC2, CC3) of chopper coil(CC) respectively,

the secondary coil(CT3) of the chopper transformer(CT) from which the amplified wave passes through a noise reduction coil(L4) and is applied to the filaments(F1, F3) of two florescent lamps(FL1, FL2) and,

a coil(L7) connected between the secondary coils(CT4, CT5) of chopper transformer(CT) coupled through noise reduction coils(L5, L6) to filaments(F2, F4) of florescent lamps(FL1, FL2) respectively,

whereby two switching transistors(TR2, TR3) are turned on and the chopper coil(CC) create a low frequency oscillating wave so the lamp is stably turned on under low current amplified by the chopper transformer(CT).


AC
C1
T
C2
BD4
C3
R1
R2
D1
A
L2
L1
TR1
R3
C4
C5
R4
R5
D2
D4
BD2
D3
R6
R7
R8
R9
R10
TR2
TR3
A
CC2
CC3
CC1
CC
L3
CT
CT1
CT2
CT3
CT4
CT5
C6
P
1
2
L4
L5
L6
L7
F1
F2
F3
F4
FL1
FL2