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Description

[0001] The invention relates to an incandescent lamp, equipped with

- a base for connection into a lamp socket, said base comprising a pair of base terminals for receiving an AC supply voltage with frequency f,
- voltage conversion means comprising
  - rectifying means having input terminals coupled to said pair of base terminals and output terminals,
  - capacitive means coupled to the output terminals and equipped with a series arrangement comprising two capacitors,
  - switching means coupled to the series arrangement comprising two capacitors for generating a first high frequency voltage out of the voltage present over the series arrangement comprising two capacitors,
  - transformer means, coupled to the switching means and comprising a primary winding and a secondary winding, for transforming the first high frequency voltage into a second high frequency voltage,
- low voltage incandescent burner means coupled to the secondary winding,
- envelope means, comprising at least a first translucent part, said envelope means being fastened to the base and together with the base enclosing the voltage conversion means and the low voltage incandescent burner means.

[0002] The invention also relates to voltage conversion means for use in such an incandescent lamp and to an adapter for supplying an incandescent lamp from an AC supply voltage source with a high frequency voltage comprising such voltage conversion means.

[0003] An incandescent lamp as mentioned in the opening paragraph is known from US 4,998,044. The known incandescent lamp is an incandescent halogen lamp. In the known lamp the switching means comprises a series arrangement of two switching elements shunting the series arrangement of the two capacitors. The two capacitors and the two switching elements together form a half bridge circuit. The primary winding of the transformer means is coupled between a common terminal of the two capacitors and a common terminal of the two switching elements. During lamp operation the first high frequency voltage is transformed by the transformer means into the second high frequency voltage that is present over the low voltage incandescent burner. The second high frequency voltage has a maximal amplitude that matches the maximal operating voltage of the low voltage incandescent burner means. The capacities of the two capacitors are equal and are chosen relatively low. Because of these relatively low values of the capacities, the capacitors are relatively small which makes it relatively easy to integrate the voltage conversion means into the incandescent halogen lamp. Furthermore these low values of the capacities cause a relatively low mains current distortion which corresponds to a relatively high value of the power factor of the voltage conversion means and to a relatively low value of the total harmonic distortion. At the same time, however, these relatively low values of the capacities causes the voltage present over the series arrangement of the two capacitors to drop to a very low value two times in every period of the AC supply voltage. In the voltage conversion means comprised in the known incandescent halogen lamp the bridge circuit is a self-oscillating circuit wherein control signals for rendering the switching elements conducting and non-conducting are derived from the current flowing through the primary winding of the transformer means by means of saturable current transformers. With a frequency 2f, however, the voltage over the capacitors becomes so low that the control signals become too weak to control the conductive state of the switching elements resulting in the bridge circuit stopping its oscillation. To be able to start oscillation once more when the voltage over the capacitors has once more reached a value that is high enough, the voltage conversion means of the known incandescent halogen lamp is equipped with a circuit part for restarting the oscillation. This circuit part comprises ohmic resistors, a startcapacitor and a DIAC. The startcapacitor is charged from the voltage over the two capacitors. When the voltage over the startcapacitor is high enough, the DIAC becomes conductive, at the same time renders one of the switching elements conductive and thereby restarts the oscillation of the bridge circuit.

[0004] Although the voltage conversion means comprised in the known incandescent halogen lamp allow the realization of a relatively high power factor and a relatively low amount of total harmonic distortion, its use is also associated with some serious disadvantages. The voltage conversion means, since they are integrated in the lamp, are at a relatively high temperature during stationary operation. A DIAC on the other hand generally has a relatively low maximum operating temperature. To make sure that the DIAC still operates under worst case conditions, the voltage conversion means have to be designed so that the amount of power that can be consumed by the low voltage burner is relatively low. Furthermore the favourable effect that the low values of the capacities of the capacitors comprised in the capacitive means have on the power factor is counteracted to a certain extent by the fact that the supply current drops to zero during a certain time lapse two times in every period of the AC supply voltage. Additionally in a self-oscillating circuit each switching element is rendered conductive while a voltage is present over it. This is called "hard switching" as opposed to "soft switching" meaning that each switch is rendered conductive while...
the voltage over it is approximately zero. Because of the hard switching a relatively high amount of power is dissipated in the switching elements increasing the total amount of heat generated and thereby the operational temperature of the voltage conversion means. Another effect of the hard switching is the generation of EMI, necessitating the incorporation of a relatively big filter in the voltage conversion means in order to make the lamp meet the requirements regarding EMI. This relatively big filter makes it very difficult to incorporate the voltage conversion means in the lamp. In a self-oscillating circuit, EMI can also be caused by a lack of symmetry of the first high frequency voltage caused by component tolerances.

The invention aims to provide an incandescent lamp that has a high power factor and a relatively low total harmonic distortion and wherein the voltage conversion means can be so designed that the amount of power consumed by the low voltage incandescent burner means is relatively high.

An incandescent lamp as described in the opening paragraph is therefore according to the invention characterized in that the voltage conversion means comprises a control circuit CC comprising an integrated circuit for generating a control signal for rendering the switching means alternately conducting and non-conducting.

The control circuit CC keeps generating the control signal for rendering the switching means alternately conducting and non-conducting irrespective of the momentary amplitude of the voltage present over series arrangement comprising two capacitors, so that it is not necessary to start the oscillation of the voltage conversion means every half period of the AC supply voltage and a circuit part for restarting the oscillation can be dispensed with. For this reason the capacitive means can be chosen relatively small, so that the power factor of an incandescent lamp according to the invention is relatively high and the amount of total harmonic distortion is relatively small. The integrated circuit is capable of operating at a much higher temperature than the circuit part for restarting the oscillation comprised in the prior art lamp disclosed in US 4,998,044. Because the voltage conversion means of an incandescent lamp according to the invention can operate at a relatively high temperature, they can consume a relatively high amount of power and can be relatively small, making it easier to integrate the voltage conversion means into the lamp. Because the generation of the control signal is realized by means of the integrated circuit the switching of the switching means is soft switching, so that the amount of power dissipated in the switching means is relatively low and therefore only a minor contribution to the total amount of heat generated in the lamp. Furthermore the symmetry of the control signal generated by the integrated circuit is independent of component tolerances and therefore relatively high. As a result the amount of EMI generated is relatively small so that if a filter is incorporated into the voltage conversion means, it can be relatively small.

Good results have been obtained with incandescent lamps according to the invention that were incandescent halogen lamps.

Preferably the switching means comprises a series arrangement comprising two switching elements and shunting the series arrangement of the two capacitors. The two series arrangements together form a so called half bridge circuit. Such a half bridge circuit is very suitable for generating the first high frequency voltage.

Since the low voltage burner is relatively small, the light emitted by the lamp can be concentrated in a beam in case part of the inner surface of the translucent envelope means is covered with a reflector. The reflector also acts as a heat shield for the voltage conversion means by reflecting the light and the infrared radiation generated by the low voltage incandescent burner means.

Preferably the base for connection into a lamp socket is a screw base suitable for connection into an Edison-type lamp socket.

It is advantageous if the incandescent lamp comprises means for controlling the amount of power consumed by the low voltage incandescent burner means. Such means for controlling the consumed power can for instance prevent an increase in the power consumed by the lamp in case the maximal amplitude of the AC supply voltage is relatively high. If the maximal amplitude of the AC supply voltage is relatively high the means for controlling the power consumed by the lamp decrease the consumed power to a level that is lower than would be the case if these control means were absent. In this way the lamp parts, more in particular the low voltage burner means, are protected from becoming too hot.

An incandescent lamp according to the invention may alternatively comprise means for reducing the power consumed by the low voltage burner means in dependency of the temperature of the voltage conversion means. The means for reducing the power consumed by the low voltage burner means in dependency of the temperature of the voltage conversion means prevent the lamp parts from becoming too hot when for instance the ambient temperature is relatively high.

Preferably the voltage conversion means comprise filter means to reduce the amount of EMI caused by the first high frequency voltage.

Preferably the voltage conversion means are so dimensioned that the power factor of the incandescent lamp is at least 0.75. The power factor of the incandescent lamp is strongly influenced by the capacities of the capacitors comprised in the capacitive means. These are the capacitors in the series arrangement and, if filter means are present any capacitor(s) comprised in the filter means. By properly choosing the capacities of the capacitors comprised in the capacitive means, the power factor of the incandescent lamp can be adjusted...
at least 0.75. In case filter are present, the power factor is of course also influenced by any inductive means comprised in such filter means.

[0016] In a preferred embodiment of an incandescent lamp according to the invention, the envelope means comprises in addition to the first translucent part a housing fastened between the base and the translucent envelope means. Such a housing can for instance be made out of plastic. It has been found that this preferred embodiment can be manufactured relatively easily.

[0017] The use of a voltage conversion means, as comprised in the embodiments of an incandescent lamp according to the invention as described hereabove, in an adapter for supplying an incandescent lamp (not equipped with its own voltage conversion means) offers the same important advantages as outlined hereabove for the use of such voltage conversion means in an incandescent lamp. Such an adapter is suitable for use with an incandescent lamp that is equipped with a low voltage incandescent burner means and a lamp base. The adapter is equipped with means I for connection to poles of the AC supply voltage source and means II for connection to the base of the incandescent lamp. The means I generally comprise a lamp base and the means II generally comprise a lamp socket. The means I are coupled to the input terminals of the rectifying means of the voltage conversion means and the means II are coupled to the secondary winding of the transformer means of the voltage conversion means. During operation, when the means I are connected to the AC supply voltage source and the means II are connected to the lamp base, the voltage conversion means comprised in the adapter generates the second high frequency voltage out of the AC supply voltage supplied by the AC supply voltage source. Via the lamp base the second high frequency voltage is coupled to the low voltage incandescent burner means comprised in the incandescent lamp.

[0018] An embodiment of an incandescent lamp according to the invention will be described making use of a drawing.

[0019] In the drawing, Figure 1 shows a schematic representation of an embodiment of an incandescent lamp according to the invention partly in cross section, and

[0020] Figure 2 shows a schematic representation of the voltage conversion means comprised in the incandescent lamp shown in Figure 1.

[0021] In Figure 1, B is a base suitable for connection into an Edison-type lamp socket. BT1 and BT2 are a pair of base terminals for receiving an AC supply voltage. VCM are voltage conversion means connected to base terminals BT1 and BT2. The voltage conversion means VCM are coupled to low voltage incandescent burner means BM by means of electrical conductors EC1 and EC2. The low voltage incandescent burner means BM are enclosed by a gastight glass lamp vessel LV. TEM are envelope means, that in this embodiment comprise only a translucent part, fastened to the base.

Between the parallel planes that are represented by means of dotted lines DL1 and DL2, the inner surface of the translucent envelope means TEM is covered with a reflector, which in this embodiment consists of a layer of aluminium.

[0022] In Figure 2, K1 and K2 are terminals for connection to the base terminals BT1 and BT2. Diodes D1-D4 are rectifying means formed in this embodiment by a diode bridge. Input terminals of the diode bridge are coupled to the terminals K1 and K2. Output terminals K3 and K4 of the diode bridge are coupled to capacitive means formed by capacitor C1 and a series arrangement of capacitors C2 and C3. Capacitor C1 is shunted by a series arrangement of choke L1 and switching elements Q1 and Q2. Capacitor C1 and choke L1 form filter means. Switching elements Q1 and Q2 form switching means for generating a first high frequency voltage out of the voltage present over the series arrangement of capacitors C2 and C3. The series arrangement of capacitors C2 and C3 shunts a series arrangement of switching elements Q1 and Q2 and resistor R1. A common terminal of switching elements Q1 and Q2 is connected to a common terminal of capacitors C2 and C3 by means of a primary winding P of transformer means T. The low voltage burner means BM shunts a secondary winding S of transformer means T. Control electrodes of switching elements Q1 and Q2 are connected to respective output terminals of an integrated circuit CIC for generating a control signal for rendering the switching elements alternately conducting and non-conducting. Resistor R1 is shunted by a series arrangement of resistor R2 and capacitor C4. A common terminal of resistor R2 and capacitor C4 is connected to a first input terminal of amplifier A1. A second input terminal of amplifier A1 is connected to an output terminal of reference voltage source RVS. An output terminal of amplifier A1 is connected to a first input terminal of voltage controlled oscillator VCO. An output of voltage controlled oscillator VCO is connected to both an input terminal of amplifier A2 as well as an input terminal of inverting amplifier A3. A second input terminal of voltage controlled oscillator VCO is connected to output terminal K4 of the diode bridge by means of resistor R3. A third input terminal of voltage controlled oscillator VCO is connected to output terminal K4 of the diode bridge by means of capacitor C5. Resistors R1 and R2, capacitor C4, reference voltage source RVS and amplifier A1 together form means for controlling the amount of power consumed by the low voltage incandescent burner means in dependency of the maximum amplitude of the AC supply voltage. The integrated circuit CIC together with resistor R3 and capacitor C5 forms a control circuit CC. Amplifiers A1, A2 and A3, reference voltage source RVS and voltage controlled oscillator VCO are all part of the integrated circuit CIC.

[0023] The voltage conversion means shown in Figure 2 function as follows.

[0024] When the terminals K1 and K2 are connected
to the poles of a source of an AC supply voltage with frequency f this AC supply voltage is rectified by the diode bridge D1-D4. As a result a DC voltage is present over capacitor C1 and another DC voltage is present over the series arrangement of capacitors C2 and C3. The dimensioning of the capacitors C1, C2 and C3 is such that the DC voltage that is present over the series arrangement of capacitors C2 and C3 drops to a very low value with a frequency 2f. As a result of this dimensioning the power factor of the voltage conversion means is high. Voltage controlled oscillator VCO generates a high frequency signal present at its output that is amplified by means of amplifiers A2 and A3 to a control signal that renders the switching elements Q1 and Q2 alternately conducting and non-conducting at a high frequency. As a result a first high frequency voltage is generated out of the DC voltage over the series arrangement of capacitors C2 and C3. Since the generation of the control signal is maintained also when the momentary amplitude of the AC supply voltage is close to zero, there is no need to restart the voltage conversion means in every half period of the AC supply voltage. The first high frequency voltage is present over the primary winding P of the transformer means. The transformer means T transform the first high frequency voltage into a second high frequency voltage that is present over the secondary winding S of the transformer means T and over the low voltage burner means BM. The transformer means are so dimensioned that the maximal amplitude of the second high frequency voltage corresponds to the maximum voltage that can be applied to the low voltage burner means BM. If the maximal amplitude of the AC supply voltage increases, the maximal amplitude of the current through resistor R1 increases. The average amplitude of the current through resistor R1 increases too. Resistor R2 and capacitor C4 together form a low pass filter acting as an integrator so that the signal present at the first input terminal of amplifier A 1 is proportional to the average value of the amplitude of the current in resistor R1. The current through resistor R1 is approximately proportional to the lamp current and, since the low voltage incandescent burner means BM are an ohmic load, also is a measure for the lamp power. Thus, the signal present at the first input terminal of amplifier A 1 is a measure for the average value of the power consumed by the lamp. The reference voltage source generates a voltage that is a measure for the desired value of the average power consumed by the lamp. The output signal of amplifier A1 controls the frequency of the signal present at the output terminal of voltage controlled oscillator VCO at such a value that the average power consumed by the lamp is approximately at the desired level irrespective of the ambient temperature. In this alternative embodiment the temperature sensor, the temperature reference source and amplifier A1 constitute means for controlling the power consumed by the lamp according to the invention the voltage conversion means were configured as in Figure 2. The low voltage burner had a nominal voltage of 12 Volt and consumed approximately 21 Watt. Capacitors C1, C2 and C3 each had a capacity of 47 nF, while choke L1 had an inductance of 470 µH. The winding ratio of the transformer was 96/12 and the frequency of the lamp current was 40 kHz. It has been found that the power factor of the lamp was over 99% and that the lamp easily met the IEC 82 requirements for THD. At the same time the voltage conversion means were small enough to be comprised in the lamp so that the lamp also met the IEC-1520-1 requirements and can be used in any lampholder equipped with an Edison type lamp socket.

**Claims**

1. An incandescent lamp, equipped with

   - a base (B) for connection into a lamp socket, said base comprising a pair of base terminals (BT1, BT2) for receiving an AC supply voltage with frequency f,
   - voltage conversion means (VCM) comprising rectifying means (D1-D4) having input terminals (K1, K2) coupled to said pair of base terminals and output terminals,
   - capacitive means coupled to the output terminals and equipped with a series arrangement comprising two capacitors (C2, C3),
   - switching means coupled to the series arrangement comprising two capacitors, for generating a first high frequency voltage out of the voltage present over the series arrangement compris-
ing two capacitors,
- transformer means (T), coupled to the switching means and comprising a primary winding (P) and a secondary winding (S), for transforming the first high frequency voltage into a second high frequency voltage,
- low voltage incandescent burner means (BM) coupled to the secondary winding,
- envelope means (TEM), comprising at least a first translucent part (TEM),

said envelope means being fastened to the base and together with the base enclosing the voltage conversion means and the low voltage incandescent burner means,

characterized in that the voltage conversion means comprises a control circuit CC comprising an integrated circuit (CIC) for generating a control signal for rendering the switching means alternately conducting and non-conducting.

2. An incandescent lamp according to claim 1, wherein the incandescent lamp is an incandescent halogen lamp.

3. An incandescent lamp according to claim 1 or 2, wherein the switching means comprises a series arrangement comprising two switching elements (Q1, Q2) and shunting the series arrangement of the two capacitors.

4. An incandescent lamp according to claim 1, 2 or 3, wherein part of the inner surface of the translucent envelope means is covered with a reflector (RE).

5. An incandescent lamp according to one or more of the previous claims, wherein the base for connection into a lamp socket is a screw base suitable for connection into an Edison-type lamp socket.

6. An incandescent lamp according to one or more of the previous claims, wherein the voltage conversion means comprise means for controlling the amount of power consumed by the low voltage incandescent burner means.

7. An incandescent lamp according to one or more of the previous claims comprising means (R1, R2, C4, RVS, A1) for controlling the power consumed by the low voltage burner means in dependency of the temperature of the voltage conversion means.

8. An incandescent lamp according to one or more of the previous claims, wherein the voltage conversion means comprise filter means (C1, L1).

9. An incandescent lamp according to one or more of the previous claims, wherein the voltage conversion means are so dimensioned that the power factor of the incandescent lamp is at least 0.75.

10. An incandescent lamp according to one or more of the previous claims, wherein the envelope means comprises a housing fastened between the base and the translucent envelope means.

11. An incandescent lamp according to claim 10, wherein the housing is made of plastic.

12. An adapter for supplying an incandescent lamp with a high frequency voltage from an AC supply voltage, said incandescent lamp being equipped with a low voltage incandescent burner means and a lamp base, comprising means I for connection to poles of the AC supply voltage source, means II for connecting to the lamp base of the incandescent lamp and voltage conversion means (VCM) comprising

- rectifying means (D1-D4) having input terminals (K1, K2) coupled to said pair of base terminals and output terminals,
- capacitive means coupled to the output terminals and equipped with a series arrangement comprising two capacitors (C2, C3),
- switching means coupled to the series arrangement comprising two capacitors, for generating a first high frequency voltage out of the voltage present over the series arrangement comprising two capacitors,
- transformer means (T), coupled to the switching means and comprising a primary winding (P) and a secondary winding (S), for transforming the first high frequency voltage into a second high frequency voltage,

the means I being coupled to the input terminals of the rectifying means of the voltage conversion means and the means II being coupled to the secondary winding of the transformer means of the voltage conversion means,

characterized in that said voltage connection means (VCM) further comprise a control circuit CC comprising an integrated circuit (CIC) for generating a control signal for rendering the switching means alternately conducting and non-conducting.

13. An adapter according to claim 12, wherein the switching means comprises a series arrangement comprising two switching elements (Q1, Q2) and shunting the series arrangement of the two capacitors.

14. An adapter according to claim 12 or 13, wherein the voltage conversion means comprise means for controlling the amount of power consumed by the low voltage incandescent burner means.
15. An adapter according to claim 12, 13 or 14, comprising means (R1, R2, C4, RVS, A1) for controlling the power consumed by the low voltage burner means in dependency of the temperature of the voltage conversion means.

16. An adapter according to claim 12, 13, 14 or 15, wherein the voltage conversion means comprise filter means (C1, L1).

17. An adapter according to claim 12, 13, 14, 15 or 16, wherein the voltage conversion means are so dimensioned that the power factor of the adapter is at least 0.75.

Patentansprüche

1. Glühlampe, ausgerüstet mit
   - einem Sockel (B) zum Anschluss in einer Lampenfassung, wobei der Sockel ein Paar Sockelklemmen (BT1, BT2) zum Empfangen einer Speisewechselspannung mit der Frequenz f umfasst,
   - Spannungswandlungsmitteln (VCM) mit
     - Gleichrichtmitteln (D1-D4), die mit dem genannten Paar Sockelklemmen gekoppelte Eingangsklemmen (K1, K2) sowie Ausgangsklemmen aufweisen,
     - mit den Ausgangsklemmen gekoppelten kapazitiven Mitteln, die mit einer zwei Kon densatorens (C2, C3) umfassenden Rei henschaltung ausgerüstet sind,
     - mit der zwei Kondensatoren umfassenden Reihenschaltung gekoppelten Schaltmit teln zum Erzeugen einer ersten Hochfre quenzspannung aus der an der zwei Kon densatoren umfassenden Reihenschal tung anliegenden Spannung,
     - mit den Schaltmitteln gekoppelten Transformatormitteln (T), die eine Primärwicklung (P) und eine Sekundärwicklung (S) zum Transformieren der ersten Hochfrequenzspannung in eine zweite Hochfrequenzspannung umfassen,
   - mit der Sekundärwicklung gekoppelten Niederspannungsglühlampenbrennern mitteln (BM),
   - Umhüllungsmitteln (TEM), die zumindest einen ersten lichtdurchlässigen Teil (TEM) umfassen, wobei die genannten Umhüllungsmittel an dem Sockel befestigt sind und zusammen mit dem Sockel die Spannungswandlungsmitteln und die Niederspannungsglühlampenbrennern mittel umschließen,
   - durch gekennzeichnet, dass das Spannungswandlungsmittel eine Steuerschaltung CC umfasst, die eine integrierte Schaltung (CIC) zum Generieren eines Steuersignals umfasst, um die Schaltmittel abwechselnd leitend und nicht leitend zu machen.

2. Glühlampe nach Anspruch 1, bei der die Glühlampe eine Halogenglühlampe ist.

3. Glühlampe nach Anspruch 1 oder 2, bei der das Schaltmittel eine zwei Schaltelemente (Q1, Q2) umfassende Reihenschaltung umfasst, die die Reihenschaltung aus den zwei Kondensatoren über brückt.

4. Glühlampe nach Anspruch 1, 2 oder 3, bei der ein Teil der Innenfläche der lichtdurchlässigen Umhüllungsmittel mit einem Reflektor (RE) bedeckt ist.

5. Glühlampe nach einem oder mehreren der vorherigen Ansprüche, bei der der Sockel zum Anschluss in einer Lampenfassung ein Gewindesockel ist, der zum Anschluss in einer Edison-Lampenfassung geeignet ist.

6. Glühlampe nach einem oder mehreren der vorherigen Ansprüche, bei der die Spannungswandlungsmittel Mittel zum Steuern der von den Niederspannungsglühlampenbrennern mitteln aufgenommenen Menge an Leistung umfassen.

7. Glühlampe nach einem oder mehreren der vorherigen Ansprüche mit Mitteln (R1, R2, C4, RVS, A1) zum Steuern der von den Niederspannungsbrennern mitteln aufgenommenen Leistung in Abhängigkeit von der Temperatur der Spannungswandlungsmittel.

8. Glühlampe nach einem oder mehreren der vorherigen Ansprüche, bei der die Spannungswandlungsmittel Filtermittel (C1, L1) umfassen.

9. Glühlampe nach einem oder mehreren der vorherigen Ansprüche, bei der die Spannungswandlungsmittel so dimensioniert sind, dass der Leistungsfaktor der Glühlampe zumindest 0.75 beträgt.

10. Glühlampe nach einem oder mehreren der vorherigen Ansprüche, bei der das Umhüllungsmittel ein zwischen dem Sockel und dem lichtdurchlässigen Umhüllungsmittel befestigtes Gehäuse umfasst.

11. Glühlampe nach Anspruch 10, bei der das Gehäuse aus Kunststoff hergestellt ist.

12. Adapter zum Speisen einer Glühlampe mit einer Hochfrequenzspannung aus einer Speisewechsel-
spannungsquelle, wobei diese Glühlampe mit einem Niederspannungsglühlampenbrennernmittel und einem Lampensockel ausgerüstet ist, mit Mitteln I zum Anschluss an Pole der Speisewechselspannungsquelle, Mitteln II zum Anschluss an den Lampensockel der Glühlampe und Spannungswandlungsmitteln (VCM) mit

- Gleichrichtmitteln (D1-D4), die mit dem genannten Paar Sockelklemmen gekoppelte Eingangsklemmen (K1, K2) sowie Ausgangsklemmen aufweisen,
- mit den Ausgangsklemmen gekoppelten kapazitiven Mitteln, die mit einer zwei Kondensatoren (C2, C3) umfassenden Reienschaltung ausgerüstet sind,
- mit der zwei Kondensatoren umfassenden Reienschaltung gekoppelten Schaltmitteln zum Erzeugen einer ersten Hochfrequenzspannung aus der an der zwei Kondensatoren umfassenden Reienschaltung anliegenden Spannung,
- mit den Schaltmitteln gekoppelten Transformatormitteln (T), die eine Primärwicklung (P) und eine Sekundärwicklung (S) umfassen, zum Transformieren der ersten Hochfrequenzspannung in eine zweite Hochfrequenzspannung, wobei die Mittel I mit den Eingangsklemmen der Gleichrichtmittel der Spannungswandlungsmittel und die Mittel II mit der Sekundärwicklung der Transformatormittel der Spannungswandlungsmittel gekoppelt sind, **dadurch gekennzeichnet, dass** die genannten Spannungswandlungsmittel (VDM) weiterhin eine Steuerschaltung CC umfassen, die eine integrierte Schaltung (CIC) zum Generieren eines Steuersignals umfasst, um die Schaltmittel abwechselnd leitend und nicht leitend zu machen.

13. Adapter nach Anspruch 12, bei dem das Schaltmittel eine zwei Schaltelemente (Q1, Q2) umfassende Reienschaltung umfasst, die die Reienschaltung aus den zwei Kondensatoren überbrückt.


15. Adapter nach Anspruch 12, 13 oder 14 mit Mitteln (R1, R2, C4, RVS, A1) zum Steuern der von den Niederspannungsglühlampenbrennernmitteln aufgenommenen Leistung in Abhängigkeit von der Temperatur der Spannungswandlungsmittel.

16. Adapter nach Anspruch 12, 13, 14 oder 15, bei dem die Spannungswandlungsmittel Filtermittel (C1, L1) umfassen.

17. Adapter nach Anspruch 12, 13, 14 oder 15, bei dem die Spannungswandlungsmittel so dimensions, dass der Leistungsfaktor des Adapters zumindest 0,75 beträgt.

**Revendications**

1. Lampe à incandescence qui est équipée de

- une base (B) pour être connectée dans une douille de lampe, ladite base comprenant une paire de bornes de base (BT1, BT2) pour recevoir une tension d'alimentation alternative avec une fréquence f,
- des moyens de conversion de tension (VCM) comprenant
- des moyens redresseurs (D1 à D4) ayant des bornes d'entrée (K1, K2) qui sont couplées à ladite paire de bornes de base et de bornes de sortie,
- des moyens capacitifs qui sont couplés aux bornes de sortie et qui sont équipés d'un montage en série comprenant deux condensateurs (C2, C3),
- des moyens commutateurs qui sont couplés au montage en série comprenant deux condensateurs pour générer une première tension haute fréquence à partir de la tension qui est présente aux bornes du montage en série comprenant deux condensateurs,
- des moyens de transformateur (T) qui sont couplés aux moyens commutateurs et qui comprennent un enroulement primaire (P) et un enroulement secondaire (S) pour transformer la première tension haute fréquence en une deuxième tension haute fréquence,
- des moyens de brûleur incandescents à basse tension (BM) qui sont couplés à l'enroulement secondaire,
- des moyens d'enveloppe (TEM) comprenant au moins une première partie translucide (TEM), lesdits moyens d'enveloppe étant fixés à la base et enfermant, en commun avec la base, les moyens de conversion de tension et les moyens de brûleur incandescents à basse tension, **caractérisée en ce que** les moyens de conversion de tension comprennent un circuit de commande CC comprenant un circuit intégré (CIC) pour générer un signal de commande afin de rendre les moyens commutateurs alternativement conducteurs et non conducteurs.

2. Lampe à incandescence selon la revendication 1,
dans laquelle la lampe à incandescence est une lampe à incandescence à halogènes.

3. Lampe à incandescence selon la revendication 1 ou 2, dans laquelle les moyens commutateurs comprennent un montage en série comprenant deux éléments commutateurs (Q1, Q2) et shuntant le montage en série des deux condensateurs.

4. Lampe à incandescence selon la revendication 1, 2 ou 3, dans laquelle une partie de la surface intérieure des moyens d'enveloppe translucides est recouverte d'un réflecteur (RE).

5. Lampe à incandescence selon une ou plusieurs des revendications précédentes 1 à 4, dans laquelle la base pour être connectée dans une douille de lampe est une douille à vis pour être connectée dans une douille de lampe du type Edison.

6. Lampe à incandescence selon une ou plusieurs des revendications précédentes 1 à 5, dans laquelle les moyens de conversion de tension comprennent des moyens pour commander la quantité de puissance qui est consommée par les moyens de brûleur incandescents à basse tension.

7. Lampe à incandescence selon une ou plusieurs des revendications précédentes 1 à 6, comprenant des moyens (R1, R2, C4, RVS, A1) pour commander la puissance qui est consommée par les moyens de brûleur à basse tension dépendamment de la température des moyens de conversion de tension.

8. Lampe à incandescence selon une ou plusieurs des revendications précédentes 1 à 7, dans laquelle les moyens de conversion de tension comprennent des moyens de filtre (C1, L1).

9. Lampe à incandescence selon une ou plusieurs des revendications précédentes 1 à 8, dans laquelle les moyens de conversion de tension sont dimensionnés de telle façon que le facteur de puissance de la lampe à incandescence soit au moins égal à 0,75.

10. Lampe à incandescence selon une ou plusieurs des revendications précédentes 1 à 9, dans laquelle les moyens d'enveloppe comprennent un boîtier qui est fixé entre la base et les moyens d'enveloppe translucides.

11. Lampe à incandescence selon la revendication 10, dans laquelle le boîtier est fabriqué à partir de plastique.

12. Adaptateur pour fournir une lampe à incandescence avec une tension haute fréquence en provenance d'une tension d'alimentation alternative, ladite lampe à incandescence étant équipée de moyens de brûleur incandescents à basse tension et d'une base de lampe, comprenant des moyens I pour être connectés à des pôles de la source de tension d'alimentation alternative, des moyens II pour être connectés à la base de lampe de la lampe à incandescence et des moyens de conversion de tension (VCM) comprenant - des moyens redresseurs (D1 à D4) ayant des bornes d'entrée (K1, K2) qui sont couplées à ladite paire de bornes de base et de bornes de sortie, - des moyens capacitifs qui sont couplés aux bornes de sortie et qui sont équipés d'un montage en série comprenant deux condensateurs (C2, C3), - des moyens commutateurs qui sont couplés au montage en série comprenant deux condensateurs pour générer une première tension haute fréquence à partir de la tension qui est présente aux bornes du montage en série comprenant deux condensateurs, - des moyens de transformateur (T) qui sont couplés aux moyens commutateurs et qui comprennent un enroulement primaire (P) et un enroulement secondaire (S) pour transformer la première tension haute fréquence en une deuxième tension haute fréquence, les moyens I étant couplés aux bornes d'entrée des moyens redresseurs des moyens de conversion de tension et les moyens II étant couplés à l'enroulement secondaire des moyens de transformateur des moyens de conversion de tension, caractérisé en ce que lesdits moyens de conversion de tension (VCM) comprennent encore un circuit de commande CC comprenant un circuit intégré (CIC) pour générer un signal de commande afin de rendre les moyens commutateurs alternativement conducteurs et non conducteurs.

13. Adaptateur selon la revendication 12, dans lequel les moyens commutateurs comprennent un montage en série comprenant deux éléments commutateurs (Q1, Q2) et shuntant le montage en série des deux condensateurs.

14. Adaptateur selon la revendication 12 ou 13, dans lequel le moyens de conversion de tension comprennent des moyens pour commander la quantité de puissance qui est consommée par les moyens de brûleur incandescents à basse tension.

15. Adaptateur selon la revendication 12, 13 ou 14, comprenant des moyens (R1, R2, C4, RVS, A1) pour commander la puissance qui est consommée par les moyens de brûleur à basse tension dépen-
16. Adaptateur selon la revendication 12, 13, 14 ou 15, dans lequel les moyens de conversion de tension comprennent des moyens de filtre (C1, L1).

17. Adaptateur selon la revendication 12, 13, 14, 15 ou 16, dans lequel les moyens de conversion de tension sont dimensionnés de telle façon que le facteur de puissance de l'adaptateur soit au moins égal à 0,75.