



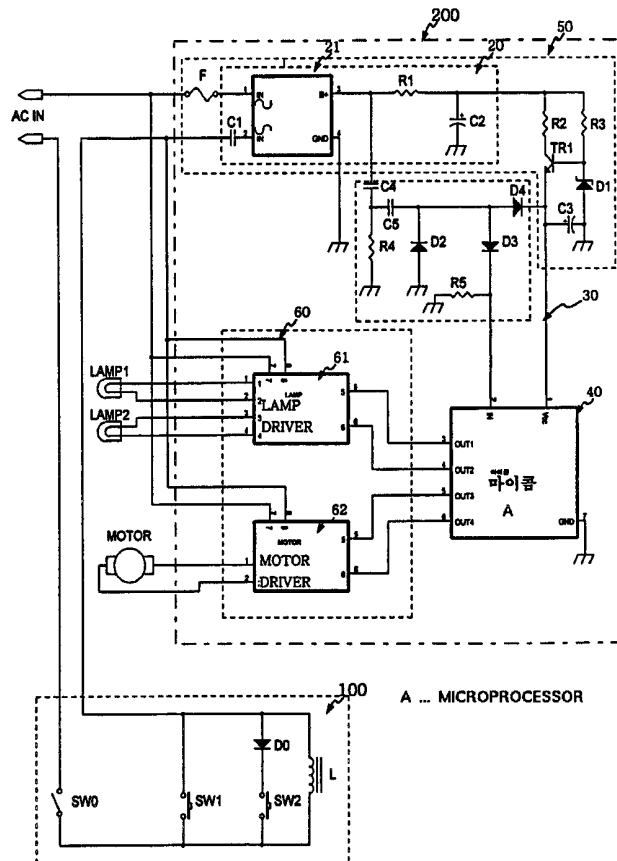
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| <p>(21) International Application Number: PCT/KR99/00779 (22) International Filing Date: 17 December 1999 (17.12.99) (30) Priority Data: 1999/14541 22 April 1999 (22.04.99) KR (71) Applicant (for all designated States except US): HAGA ELECTRONICS CO., LTD. [KR/KR]; 11F, Cheonrok Bldg., 1351-3, Shingil-dong, Youngdeungpo-Gu, Seoul 150-057 (KR). (72) Inventor; and (75) Inventor/Applicant (for US only): KIM, Jihm-Kuk [KR/KR]; 925-13, Bangbae-Dong, Seocho-Gu, Seoul 137-060 (KR).</p> | <p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report. In English translation (filed in Korean).</p> | |

(54) Title: AC POWER SWITCH LINE CONTROLLED CONTROLLER

(57) Abstract

AC power switch line controlled controller which is to use the existing switch wiring, comprising a power switch means and a controller, the power switch means composed with a main switch and a coil which is connected in series each other, a momentary switch connected in parallel with the coil, a diode and another momentary switch after being connected in series with each other connected in parallel with the above coil, user can control the electric products with those two momentary switches as he wants. The controller, installed in the electric product, composed with pulse signal generating part, signal defecting part, micro controller part, drive circuit part and power supply part, controls the electric product in response to the control signal from the power switch means transmitted through the AC power switch line. According to the present invention, only two momentary switches are manipulated without changing the existing wiring for the switch and the existing wiring for the electric product at a ceiling to control the electric product like ceiling fan with lighting lamps.



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AC POWER SWITCH LINE CONTROLLED CONTROLLER**TECHNICAL FIELD**

The present invention relates in general to an AC power switch
5 line controlled controller for controlling a electric product like
lighting lamps, ceiling fan etc, uses existing AC power switch line
wirings, more particularly only with the manipulation of momentary
switches installed user can conveniently control electric product
like lighting lamps, ceiling fan, etc, as he wants.

10

BACKGROUND ART

Fig. 1 is a circuit diagram showing the construction of a
conventional lighting lamp controller. As shown in this drawing,
the lighting lamp controller comprises an on/off wall switch 1
15 turned on to supply lamp driving power, and a lamp switching pull
string 2 for manually switching states of first and second lamps L1
and L2 mounted on a ceiling. The pull string 2 is connected to an
interlocking switch part 3, which is composed of a first switch SW1
connected to the first lamp L1 and a second switch SW2 connected to
20 the second lamp L2.

The operation of the conventional lighting lamp controller
with the above mentioned construction will hereinafter be described.

If the on/off wall switch 1 is turned on, the drive power is
continuously supplied to the lighting fixture. Then, if the lamp
25 switching pull string 2 is pulled downwardly according to a user's
selection, only the first lamp L1 is turned on. If the pull string
2 is pulled downwardly once more, the second lamp L2 is turned on at
the same time that the first lamp L1 is turned off. If the lamp
switching pull string 2 is pulled once again, both the first and
30 second lamps L1 and L2 are turned on. Then, if the pull string 2 is
pulled once more, both the first and second lamps L1 and L2 are
turned off.

As mentioned above, in the conventional lighting lamp
controller, the switches for controlling the lighting lamps are
35 installed in two places, or the wall and ceiling. For this reason,
it is necessary for the user to manipulate all the switches situated

on both the wall and ceiling, resulting in an inconvenience in turning on lamps. Further, when the user pulls the lamp switching pull string 2 hung down from the ceiling, the lamps may shake or otherwise be moved under the force of pulling downward on the pull string 2. This causes the user concern or uneasiness and provides an aesthetically unappealing sight.

Furthermore, it is very hard for the user to use the lamp switching pull string 2 to switch states of the lamps if the user is a child or in poor health or the ceiling is very high, because the pull string 2 may be out of reach.

DISCLOSURE OF INVENTION

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide an AC power switch line controlled controller in which only two momentary switches are manipulated without changing the existing wiring for the switch and the existing wiring for the lamps and ceiling fan at a ceiling to turn on or off the lamps in order and to control the speed of ceiling fan, resulting in a simplicity in construction and use and an increase price competitiveness of products.

In accordance with the present invention, the above and other objects can be accomplished by a provision of an AC power switch line controlled controller, comprising a unique power switch means installed on the existing AC power switch line and a unique controller installed on an electric product like lighting lamps, ceiling fan, etc. Where the switch means supplying alternating current power to the electric products and performing a switching operation under the control of the user to generate a control signal, and the controller including a pulse signal generator for generating a pulse signal in response to the control signal from the power switch means, a pulse signal separator for separating the pulse signal from the pulse signal generator to feed it to the microprocessor, a microprocessor which outputs the control output signal in response to the control signal from the switch means, a driving circuit block which drives lamps and fan motor in accordance with the control output signal from the microprocessor, and a power

supply circuit for supplying desired direct current power to the component in the controller.

Preferably, the power switch means may include a main switch and a coil connected in series, a momentary switch connected in parallel with the coil, another momentary switch and a diode after
5 being connected in series with each other, connected in parallel with the coil.

The pulse signal generator may generate the pulse signal of AC line frequency when the second momentary switch SW2 connected in series with a diode is switched on, the pulse signal of twice of AC
10 line frequency when none of the momentary switches is switched on, not generate the pulse signal when the first momentary switch Sw1 which is connected in parallel with the coil is switched on.

15 BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which :

20 Fig. 1 is a circuit diagram showing the construction of a conventional controller

Fig. 2 is a circuit diagram showing the construction of an AC power switch line controlled controller in accordance with the present invention ; and

25 Fig. 3 is a timing diagram, showing the controlling method for lighting lamps by a first momentary switch SW1 in Fig. 2.

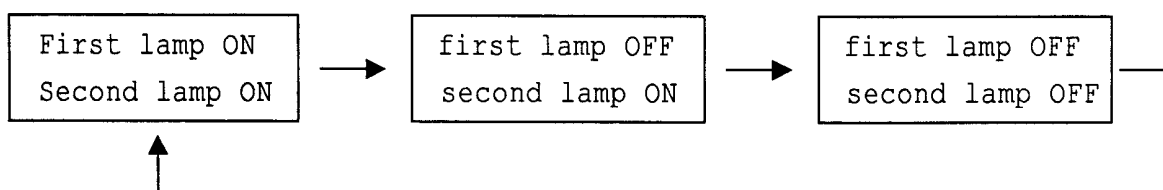
Fig. 4 is a timing diagram, showing the controlling method for ceiling fan by a secondary momentary switch SW2 in Fig. 2.

30 BEST MODE FOR CARRYING OUT THE INVENTION

Fig. 2 is a circuit diagram showing the construction of an AC (alternate current) power switch line controlled controller in accordance with the present invention. As shown in this drawing, AC power switch line controlled controller comprises a power switch
35 part 100 (hereinafter switch means) and electric product control part 200 (hereinafter controller), where if the main switch SW0 of the power switch part is switched on, electricity is supplied to control

part 200 via coil L and switch wirings. Then microprocessor 40 in the controller 200 goes to stand by mode. In this state the first momentary switch SW1 is touched on once, microprocessor 40 sensing this signal turns on first lamp LAMP1 and second lamp LAMP2 all together as shown in Fig. 3. If the first momentary switch SW1 is touched on once more microprocessor 40 sensing this signal turns off the first lamp LAMP1 and turns off the second lamp LAMP2. In this state if the first momentary switch SW1 is touched on once more, microprocessor 40 sensing this signal turns off first and second lamp LAMP1, LAMP2 all. As explained above if the main switch SW0 of the switch means 100 is switched on, whenever the first momentary switch SW1 is manipulated by the user, microprocessor 40 controls two lamps as follows

15



20

The microprocessor 40 senses the input of first momentary switch SW1 with the existence and nonexistence pulse train. If the pulse train is not existent the microprocessor 40 determines as the first momentary switch SW1 is touched on, because the pulse signal generator 20 does not generate pulse signal when the first momentary switch SW1 is switched on.

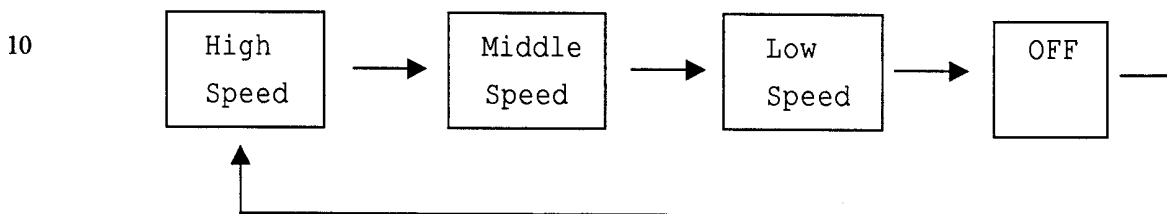
Hereinafter the function of second momentary switch SW2 will be described. The second momentary switch SW2 is series connected with diode D0 and then parallel connected with coil L as shown in Fig. 2.

When the main switch SW0 is switched on, resulting electricity supplied to the electric product controlled, if the secondary momentary switch SW2 is touched on once, the microprocessor 40 sensing this signal controls the ceiling fan motor in high speed via motor drive circuit 62 as shown in Fig. 4. If the secondary momentary switch SW2 is touched on once more the microprocessor 40 controls the ceiling fan motor in middle speed.

If the secondary momentary switch SW2 is touched on once again (totally 3 times) microprocessor 40 controls the ceiling fan motor

362in low speed.

Then if the secondary momentary switch SW2 is touched on once more (totally 4 times), the microprocessor 40 turns the ceiling fan motor off. As described above when the main switch is switched on, whenever the secondary momentary switch SW2 is manipulated by the user, the microprocessor 40 controls the ceiling fan monotr as follows.



15

The microprocessor 40 senses the input of secondary momentary switch SW2 with the existance and nonexistence of AC power line frequcy pulse trains. If the pulse train of line frequency exist, the microprocessor 40 determines as the secondary momentary switch SW2 is touched on, because the above pulse signal generator 20 generates the pulse train of line frequency when the secondary momentary switch SW2 is switched on.

20

As functions above the relationship between the switch input of power switch means 100 and the frequency of pulse train generated in pulse signal generator 20 is as follows

25

| State of switch input | Operation of pulse signal generator |
|--|---|
| First momentary switch ON | Does not generate pulse |
| First momentary switch OFF Secondary momentary switch ON | Generates pulses of power line frequency |
| First momentary switch OFF Secondary momentary switch OFF | Generates pulses of twice frequency of power line frequency |

30

This because when the first and secondary momentary switch of switch means 100 are off, electricity is supplied to the electric product always through coil L the direction of coil current alternated two times per line period and the pulse generator 20 of the controller
5 200 generates each one pulse by counter electromotive force induced in coil when alternates the direction of the coil current.

Furthermore when the first momentary switch SW1 is switched on, almost all current flows through first momentary switch, pulse is not induced and generated in the pulse signal generator 20. And

10 when the first momentary switch is off and the secondary momentary switch is switched on, the pulse generator 20 of the controller 200 generates a pulse when current changes from diode Do to coil L that is the same frequency with the line frequency of pulse is generated.

The pulse signal generator 20 as functions above is composed with

15 first and secondary condenser C1, C2, bridge rectifier 21, and first resistor R1. While the power supply part 50 is composed with fuse F,

first and secondary, third condenser C1, C2, C3 bridge rectifier 21, first through third resistor R1, R2, R3, transistor TR, zener diode D1 where the power supply 50 is to supply direct current power to

20 each part in the controller 200. The signal detecting part 30 composed with the fourth and fifth condenser C4, C5, the fourth and fifth resistor R4, R5, and the secondary through the fourth diode D2, D3, D4, is to extract pulse signal from the pulse signal generator 20 and clamp the signal level fit to the microprocessor and feed it

25 to the microprocessor 40 so as to senses the control signal. The

lamp driving circuit 61 drives lamp1 and lamp2 in response to the lamp control signal outputs OUT 1 and OUT 2 of the microprocessor 40, while the motor driving circuit 62 controls the speed of ceiling fan

30 motor or turns on and off the ceiling fan motor in response to the motor control signals OUT 3 and OUT 4 of the microprocessor 40.

The preferred embodiments of the present invention have been described above, referring to Fig. 2, Fig. 3 and Fig. 4. Although the illustration were made for the composite product of ceiling fan with lighting lamps, the skill of the present invention, "an AC
35 power line controlled controller" may be adopted to all electric products used after of which power switch being connected with AC power switch wiring.

As apparent from the above description, the present invention of an AC power line controlled controller, transfers the power and control signals all together via AC power switch line. Therefore when the present invention is adopted to the products used connected to existing switch line like ceiling fan and lighting lamps, the present invention has the effect of providing a simplicity in construction and use and increasing the price competitiveness of the products.

WHAT IS CLAIMED IS:

1. AC power switch line controlled controller, comprising:
Power switch means including a first momentary switch, secondary momentary switch, coil and diode, said first momentary switch connected in parallel with said coil, said secondary momentary switch, after being connected in series with said diode, connected in parallel with said coil, said power switch means being connected to the AC power switch line, supplying AC power to the controller and performing a switching operation under the control of the user ; and controller including a pulse signal generator and microprocessor, said pulse signal generator not generating a pulse signal when said first momentary switch is switched on, generating the same frequency of pulses with the line frequency, when said secondary momentary switch is switched on and generating the twice frequency of pulses of the line frequency when said first and secondary momentary switches are all off, said microprocessor reading the frequency of pulse generated by said pulse signal generator determining the switch operation of said switch means and controlling the electric product in accordance with a predetermined order.

FIG. 1

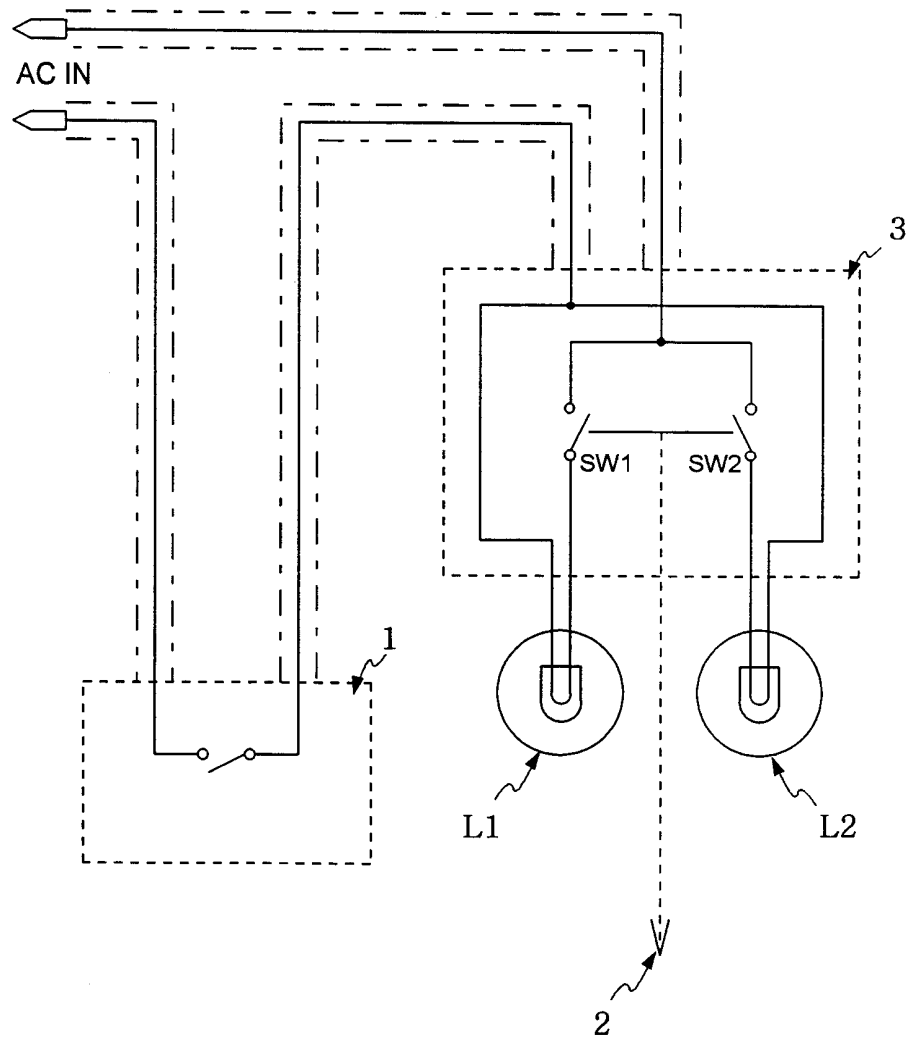


FIG. 2

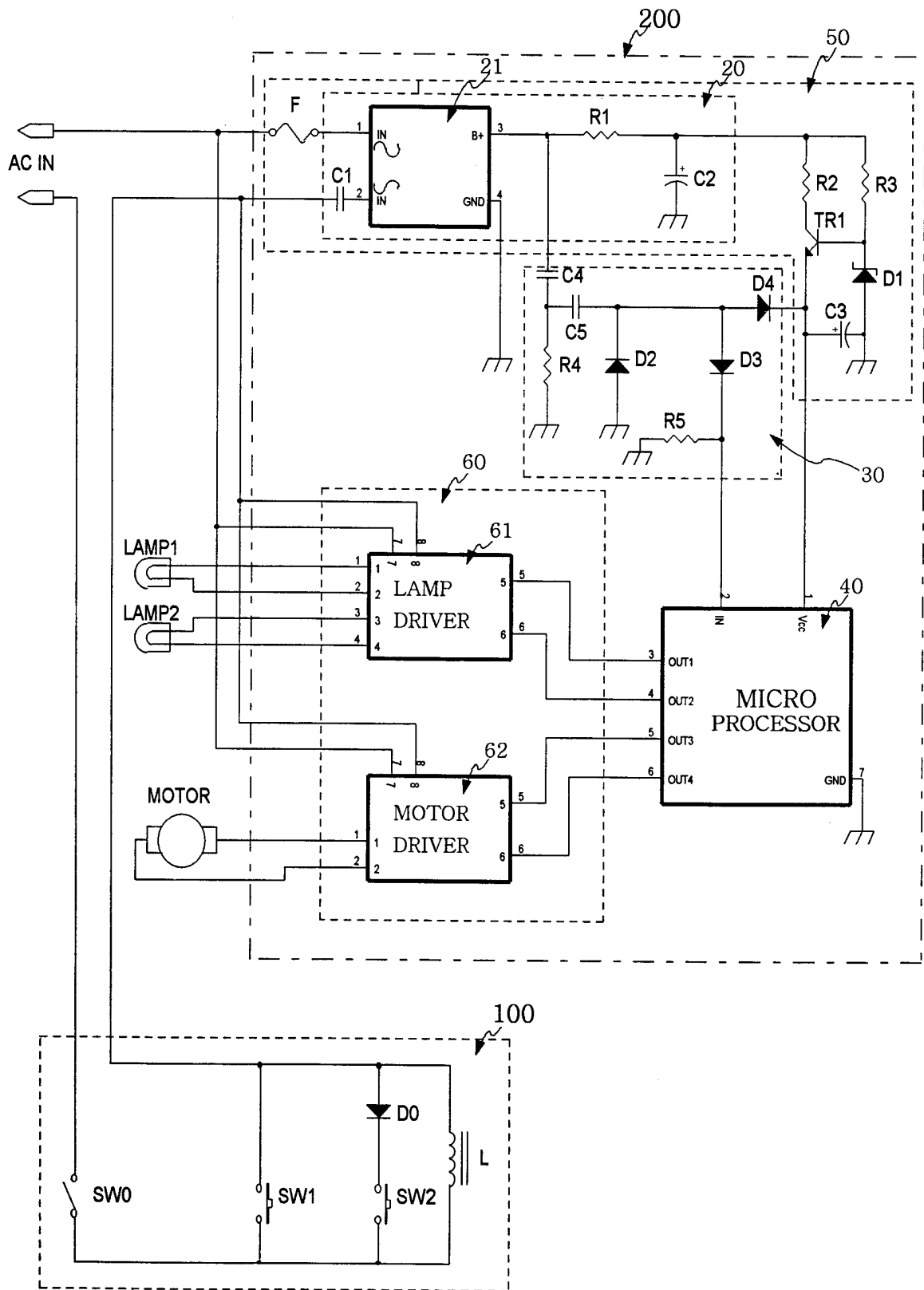


FIG. 3

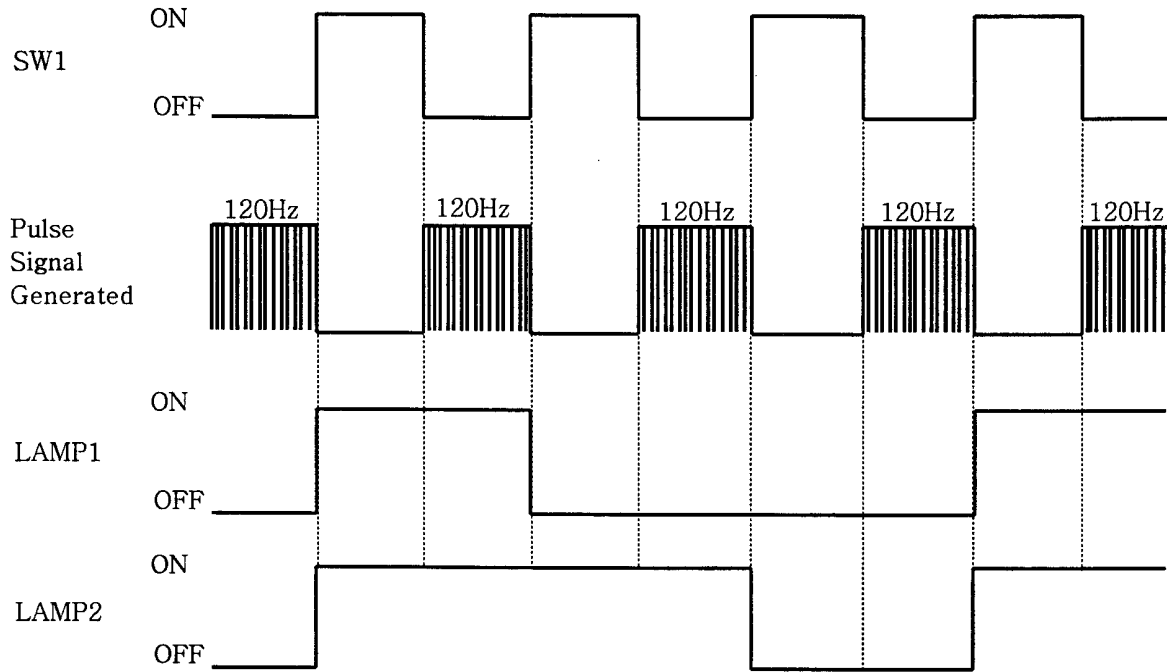
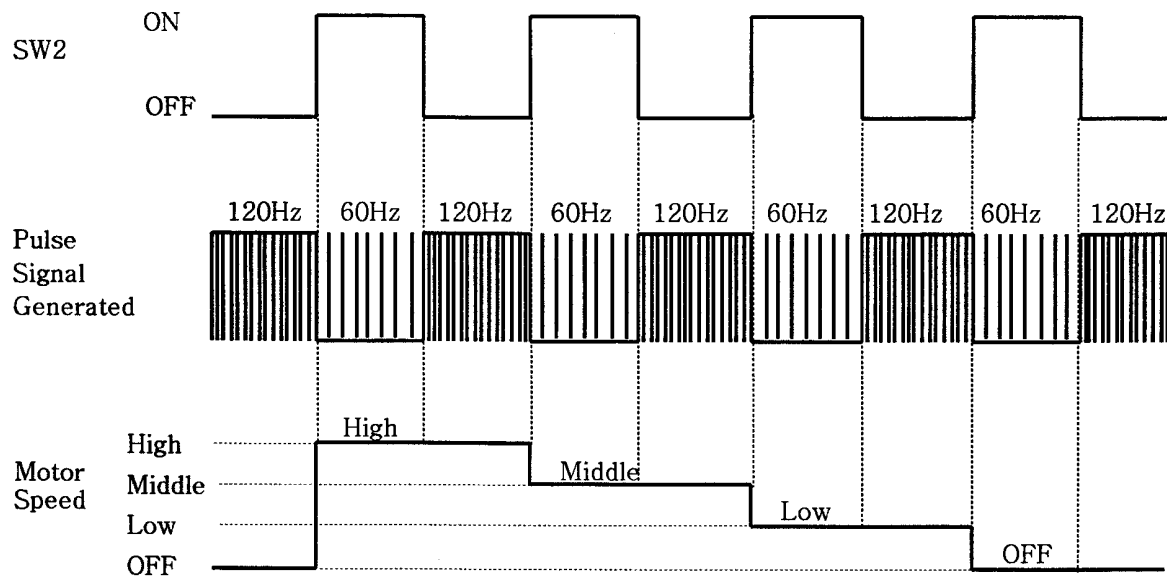


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR99/00779

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H05B 37/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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IPC7 H05B 37/02

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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