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(54) AN IMPROVEMENT OF A STRUCTURE OF AN ELECTRONIC WRITING BELT

(57) This invention relates to an electrical go-go light belt having a plurality of lamp sections comprising a control system for outputting sawtooth-wave or step-wave voltage to control the turning on speed, full-on and full-off holding durations of the lamp section. The electrical go-go light belt also comprises a relay circuit for driving the bulbs of a next lamp section to turn on, a plurality of lamp sections having a plurality of bulbs which can be sequentially turned on one by one by the controlling units receiving the sawtooth-wave or step-wave voltage from the control system and a turn-off system which, when receiving a signal to release the inhibition state from the terminal bulb of the final lamp section upon turning on, generates a turn-off signal which is transmitted to the control system to automatically turn off all the bulbs of the go-go light belt.

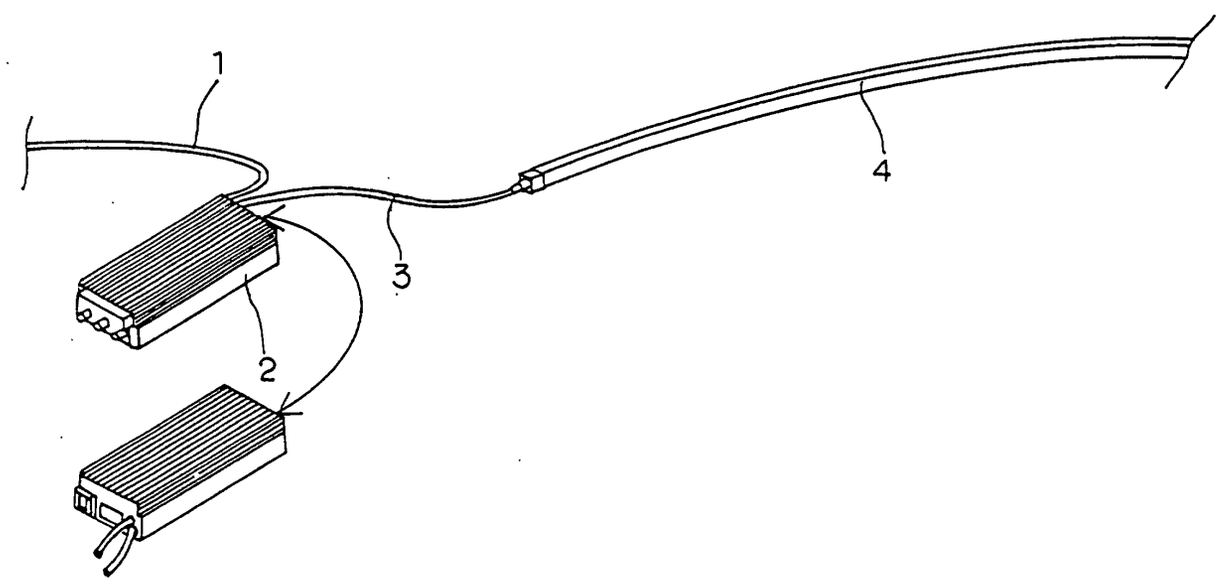

FIG.1

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Description

[0001] This invention relates to an electrical go-go light belt, in particular to a structure in which the sawtooth-wave or step-wave voltage generated by a control system transmits to lamp sections via a driving line, the voltage of the rising sawtooth-wave or step-wave forms a trigger voltage on a divider in order to trigger a silicon controlled rectifierSCR, then the bulbs which are connected in series with the positive pole of the SCR turn on one by one. The terminal bulb in the preceding lamp section is turned on to trigger the sawtooth-wave or step-wave generator of the relay circuit of the present lamp section so as to emit sawtooth-wave or step-wave voltage which is useful for turning on the bulbs of the present lamp section. The control system can regulate the frequency of sawtooth-wave or step-wave voltage emitted from the sawtooth-wave or step-wave generator of the lamp section and relay circuit in order to control the turn-on speed. When the terminal bulb of the final lamp section is turned on, the turn-off system is triggered to output a turn-off signal to the control system, and the control system outputs low voltage to make all the bulbs of the go-go light belt turn off. If more lamp-sections are to be installed, one or more relay power supplies are mounted to replace the control system to provide electrical power to the lamp sections and relay circuits, thus the go-go light belt can extend to an endlessly long distance.

[0002] Currently, the well-known belt lamp flashes as a conventional revolving lamp does. The bulbs of the well-known belt lamp can not be turned on one by one, and the turn-on speed and the lighting duration of bulbs cannot be controlled. All the bulbs can not be turned on simultaneously. If the bulbs are to be turned off, the power must be turned off. Therefore, all the bulbs cannot be automatically turned off. All the bulbs cannot be turned off and sequentially turned on. The belt lamp cannot exhibit passive flash.

Furthermore, because a relay power supply is not installed, additional belt lamps cannot be added and the length of the belt lamp is thereby limited. The ornamental lamp exhibition is not versatile and is complicated, thus, the belt lamp can only monotonously flash and is not useful for advertisement and ornament.

[0003] It is an object of the present invention to provide an electrical go-go light belt having writing and versatile ornamental functions. The functions are achieved by generating a sawtooth-wave or step-wave voltage in the control system, triggering the SCRs in the present lamp section in order to turn on one by one the bulbs in series with the SCRs, and triggering the relay circuit in the next lamp section by the turning on of the terminal bulb of the present lamp section so as to sequentially drive and turn on the bulbs of the next lamp section.

[0004] It is another object of the present invention to provide a turn-on control method which is achieved by emitting a frequency control signal in order to control the turning on of the bulbs of the go-go light belt.

[0005] It is another object of the present invention to provide a new automatic turn-off function for the go-go light belt which is achieved by outputting a turn-off signal from the turn-off system to the control system.

[0006] It is another object of the present invention to provide an endlessly long go-go light belt by Installing relay power supplies to provide electrical power to additional lamp sections connected in series with the next lamp section.

[0007] This invention is characterized in that the sawtooth-wave or step-wave generator of the control system outputs sawtooth-wave or step-wave voltage to a voltage amplifier and driver, the amplified sawtooth or step waves transmit to a lamp section via a driving line, and transmit to a voltage divider of the control unit so as to generate a trigger voltage useful for triggering the gate of a SCR and turning on the bulbs connected in series. The trigger voltage required for triggering the gate of the SCR increases along the sequence of the SCRs. The sawtooth or step wave voltage having rising value turns on each of the bulbs sequentially, the relay circuit in the next lamp section receiving the signal from the present lamp section which releases the inhibition state of the next lamp section after the terminal bulb in the present lamp section is turned on and the terminal control unit transmits the signal which triggers the relay circuit of the next lamp section to emit sawtooth-wave or step-wave voltage in order to turn on the bulbs of the next lamp section. The turn-on speed is regulated by a speed controller. The speed controller emits a control signal having a single variable frequency to control the frequency of sawtooth-wave or step-wave voltage generated by the relay circuit and the frequency of sawtooth-wave or step-wave voltage generated by the sawtooth or step-wave generator, thereby the turn-on speed of the bulbs is controlled. When the terminal bulb in the final lamp section is turned on, a signal to release the inhibition state is transmitted to the turn-off signal oscillator of the turn-off system. The oscillator of the turn-off system is triggered to output a turn-off. signal to the control system. The sawtooth-wave or step-wave generator outputs a low voltage which cannot trigger the bulbs to be truned on, therefore all the bulbs of the go-go light belt turn off. A full-on time controller and a full-off time controller can control the holding duration of the full-on or full-off state, a relay power supply is installed to provide electrical power to the additional lamp sections and relay circuits, thus, the go-go light belt can extend to endlessly long distance.

[0008] Fig.1 is a structural view of the go-go light belt of the present invention.

[0009] Fig.2 is a three-dimensional view of the first lamp section of the go-go light belt of the present invention.

[0010] Fig.3 is a block diagram of the control system of the go-go light belt of the present invention.

[0011] Fig.4 is a circuit drawing of the control system

of the go-go light belt of present invention.

[0012] Fig.5 is a schematic view of the relay power supply of the present invention.

[0013] Fig.6 is a block diagram of the relay circuit and turn-off system of the go-go light belt of the present invention.

[0014] Fig.7 is a structural view of the go-go light belt of the present invention.

[0015] Fig.8 is a three-dimensional view of an end signal generator of the present invention.

[0016] Fig.9 is a three-dimensional view of an end signal generator of the present invention.

[0017] Fig.10 is a three-dimensional view of a lamp section and the next lamp section of the present invention.

[0018] Fig.11 is a three-dimensional view of the connector between a lamp section and the next lamp section of the present invention.

[0019] The go-go light belt of the present invention comprises a control system 2, a jamp section 4, a relay circuit 5, a relay power supply 6 and a turn-off system 8 as shown in Figures 1 and 6. A power linel provides electrical power to the go-go light belt. A transmission line 3 transmits siganls between the lamp section 4 and the control system 2. If other lamp sections are to be connected to the first lamp section 4, a relay power supply 6 should be installed to provide electrical power via power line 61 as shown in Fig.7. A T-type connector 7 is arranged between the relay power supply 6 and the lamp section4.

[0020] Fig.3 shows a block diagram of the control system 2 of the go-go light belt.

[0021] In the control system 2, an oscillator 231 generates pulses to trigger a sawtooth-wave or step-wave generator 211 to output sawtooth-wave or step-wave voltage which is amplified by a voltage amplifier and driver 212. The amplified sawtooth-wave or step-wave voltage is transmitted to a control unit via a driving line. The sawtooth-wave or step-wave voltage forms a trigger voltage on a voltage divider circuit to trigger a silicon controlled rectifier SCR. A speed controller 23 regulates the pulses generated by the oscillator 231 to control the frequency of the sawtooth-wave or step-wave voltage emitted by the sawtooth-wave or step-wave generator. The oscillator 231 causes a driver 232 to emit a frequency-regulating signal which is transmitted to the relay circuit 5 via a signal line. The sawtooth-wave or step-wave generator 52 receives the frequency-regulation signal to regulate the frequency of the emitted sawtooth-wave or step-wave voltage so as to control the speed of turning on the bulbs. When the signal line transmits the turn-off signal emitted by the turn-off system 8, the frequency-regulating signal ceases to be transmitted through the signal line. The turn-off signal amplifier and monitor 27 checks the received turn-off signal, and when this checks out, the full-on time controller 22 and full-off time controller 21 control the holding duration by using a time delay method after which a signal is emitted to trigger the sawtooth-wave or step-wave generator 211 to output low voltage, thus, the bulbs of the go-go light belt turn off immediately. The AC power source is connected to a bridge rectifier 25. The bridge rectifier 25 outputs forward rectified voltage which is transferred to the lamp section 4 via a positive line+while the ground voltage is output from the bridge rectifier 25 to the lamp section 4 via a negative line - . A storage charge accelerated discharger 26 is mounted for completely discharging as an auxiliary device which is useful for the SCR42 to carry out the turn-off action. The relay circuit power supply 24 provides electrical power to relay circuit 5 through a relay circuit power line.

[0022] Fig.5 shows the structure of the lamp section 4 of the go-go light belt. In the lamp section 4 the control system 2 transmits a sawtooth-wave or step-wave voltage via a driving line to the voltage divider circuit 43 which is composed of two resistors in the control unit which generate a triggering voltage. When the triggering voltage reaches a predetermined level the electrical switch of a SCR42 is triggered and the SCR42 becomes conductive, and the bulb which is connected in series to the positive pole of the SCR42 turns on. Because the required triggering voltages increase along the sequence of bulbs, each of the bulbs turns on as the sawtooth-wave or step-wave voltage is applied on the voltae divider circuits. The speed of turning on the bulb is determined by the frequency-regulating signal transmitted from the control system 2 via the signal line. The negative pole of the SCR42 is connected to the negative line-which is connected to the control system 2 . When the terminal bulb in the present lamp section turns on, a signal to release the inhibition state is output to the sawtooth-wave or step-wave generator of the relay circuit 5 of the next lamp section.

[0023] Fig.6 shows the structure of the relay circuit 5 and trun-off circuit 8 of the go-go light belt. The power supply 51 of the relay circuit 5 rece ives the electrical power from the power supply 24 of the control system 2 and provides electrical power to the sawtooth-wave or step-wave generator 52 which receives the signal to release the inhibition state from the preceding lamp section and which is triggered to output sawtooth-wave or step-wave voltage which is supplied to the voltage amplifier and driver 521 to generate sawtooth-wave or step-wave voltage which is applied to the lamp section via the driving line to turn on the bulb 41 so that the function and effect of triggering and driving another next lamp section is accomplished. When the terminal bulb of the last lamp section turns on, a signal to release the inhibition state is output to the turn-off system 8 to trigger the turn-off signal oscillator 81 to emit a turn-off signal which is transmitted to control system 2 via the signal line to control the holding duration of all bulbs turning on full-onor all bulbs turning off full-off.

[0024] Relay power supplies 6 and relay circuits 5 can provide electrical current to a plurality of lamp section 4 when appropriate so that an endlessly long light belt can

be turned on and illuminated.

[0025] In Fig.7, the line 61 of relay power supply 6 provides the electrical power to a next lamp section. A T-type connector 71 can be connected between two lamp sections to branch to a branch lamp section 62.

[0026] In Fig.8, the lamp section 44 is cut off and is inserted into an end signal generator 46. In Fig. 6B, an end signal generator 84 is made by injection with the female side of a lamp section.

[0027] In Fig.10, between a first lamp section 4 and a second lamp section 50 is a relay 51 in the female side of a lamp section. In the relay 51 is a relay circuits 0. In Fig.7B, the male side 52 of a lamp section can be inserted into the female side of another lamp section. The male side can be fixed to the female side by a screw.

[0028] In Fig. 4, the frequency of the emitted sawtooth-wave or step-wave voltage generated by the sawtooth-wave or step-wave generator 211 is controlled by a speed controller 23. The sawtooth-wave or step-wave signal emitted by the sawtooth-wave or step-wave generator 211 is amplified by a voltage amplifier, and the current is amplified by a driver 212 before being transmitted to a SCR. The turn-off signal amplifier and monitor 27 detects the 32768 Hz turn-off signal, then , the full-on time controller 22 an d full-off time controller 21 control the action of turning on and turning off the go-go light belt, e.g. time delay, holding duration, etc. The power supply 51 provides the working power to the above circuits.

[0029] The go-go light belt of this invention has the following advantages:

1 The rising sawtooth-wave or step-wave voltage triggers the bulbs in a lamp section one by one.
2 The speed of turning on all the bulbs can be regulated.
3 The holding duration of full-on and full-off can be automatically controlled.
4 The relay circuit carries out the sequential turning on of the next lamp section.
5 The installation of relay power supplies can extend the go-go light belt to endless distance.

[0030] Although the present invention has been described in detail, it should be understood that various changes, substitutions and alterations can be made thereto without departing from the spirit and scope of the present invention as defined in the appended claims.

Claims

1. An electrical go-go light belt having a plurality of lamp sections comprising:

   a control system for outputting sawtooth-wave or step-wave voltage to control the turning on speed, full-on and full-off holding durations of the lamp section;
   a relay circuit for driving the bulbs of a next lamp section to turn on;
   a plurality of lamp sections having a plurality of bulbs which can be sequentially turned on one by one by the controlling units receiving the sawtooth-wave or step-wave voltage from the control system;
   a turn-off system which, when receiving a signal to release the inhibition state from the terminal bulb of the final lamp section upon turning on, generates a turn-off signal which is transmitted to the control system to automatically turn off all the bulbs of the go-go light beltan d one or more relay power supplierto provide electrical power to additional lamp sections so that the length of the light belt canextend to unlimited distance.

2. An electrical go-go light belt as clamed in claim 1 wherein the oscillator of the control system triggers a sawtooth-wave or step-wave generator to emit a rising sawtooth-wave or step-wave voltage, which is then amplified and output to a lamp section to turn on the bulbs one by one, a speed controller emitting a control signal to regulate the frequency of the sawtooth-wave or step-wave voltage emitted by the oscillator of the control system and/or the relay circuit so that the speed of turning on the bulbs one by one can be controlled, relay power supplies providing electrical power to the relay circuits and bridge rectifiers providing electrical power to the lamp sections, a turn-off signal amplifier and monitor which upon receiving a trun-off signal causes the sawtooth-wave or step-wave generator to output low voltage thereby turning off all the bulbs of the go-go light belt so that the holding duration of full-on time and full-off time is controlled.

3. An electrical go-go light belt as claimed in claim 1 wherein a control unit comprising a plurality of resistors and a silicon controlled rectifier (SCR), responsible for the turning on and turning off of the bulbs, a control system for generating voltage and applying the voltage to a voltage divider which comprises a plurality of resistors, producing a triggering voltage to trigger the SCR to conduct, therefore, the bulb connected in series to the positive pole of the SCR is turned on, the triggering voltage increasing as the voltage of the sawtooth-wave or step-wave rises gradually, thus, each of the control units is triggered to turn on each of the bulbs sequentially, the turn-on speed regulated by the control system.

4. An electrical go-go light belt as claimed in claim 1, wherein the sawtooth-wave or step-wave generator of the relay circuit receives a signal to release the inhibition state from the terminal bulb upon turning

on thereby outputting a sawtooth wave or step wave causing, by using a voltage amplifier and driver, to emit a sawtooth-wave or step-wave voltage to drive another lamp section to be turn on, the frequency of the sawtooth-wave or step-wave is regulated by the control system.

5. An electrical go-go light belt as claimed in claim 1 wherein when the turn-off signal oscillator of the turn-off system receives a signal to release the inhibition state from the terminal bulb of the final lamp sections, the turn-off signal oscillator is triggered to transmit a turn-off signal to the control system in order to turn off all the bulbs of the go-go light belt.

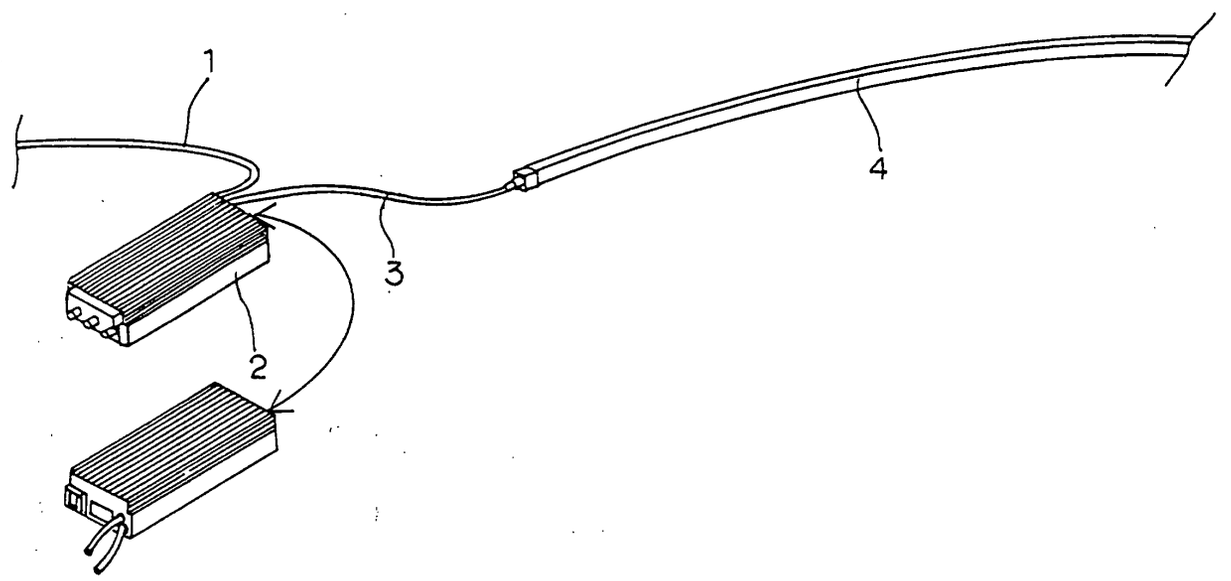

FIG.1

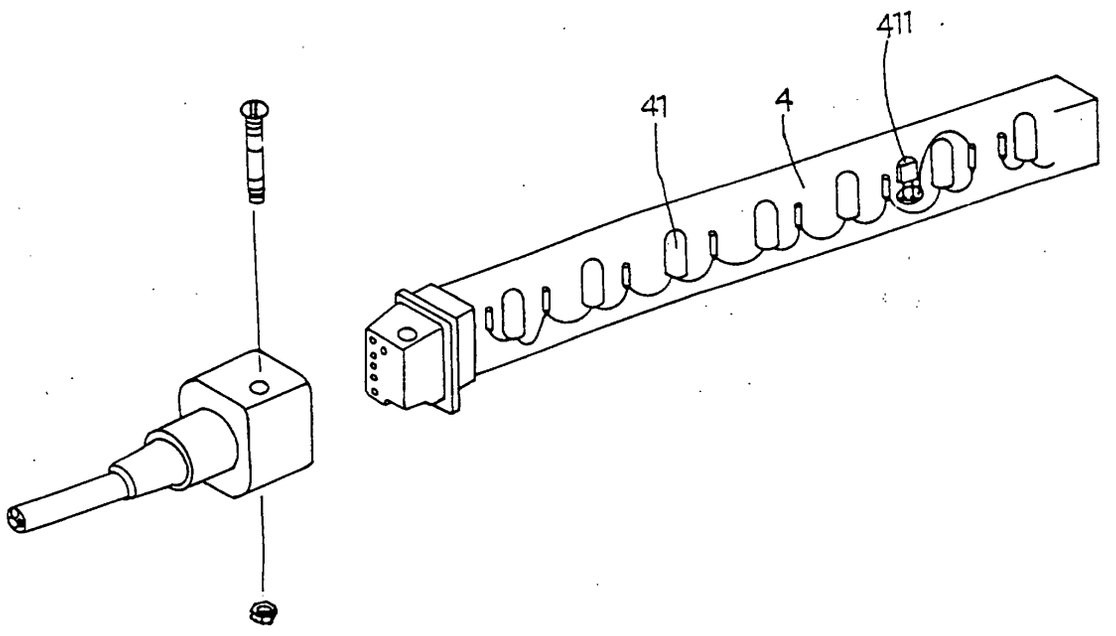

FIG.2

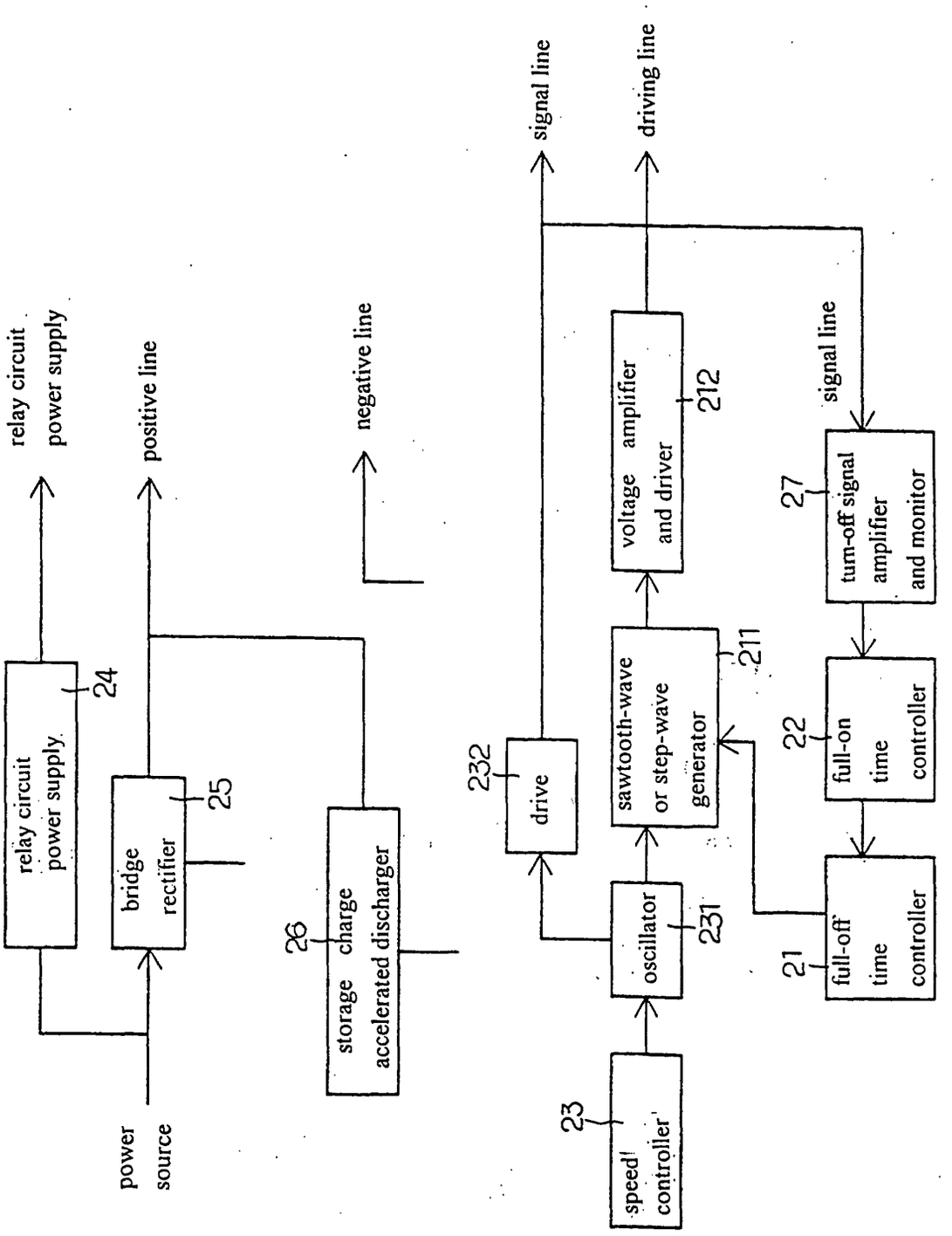
relay circuit power supply
positive line
negative line
signal line
driving line
signal line
power source
relay circuit power supply
24
bridge rectifier
25
storage charge accelerated discharger
26
speed controller
23
oscillator
231
drive
232
sawtooth-wave or step-wave generator
211
voltage amplifier and driver
212
full-off time controller
21
full-on time controller
22
turn-off signal amplifier and monitor
27

FIG.3

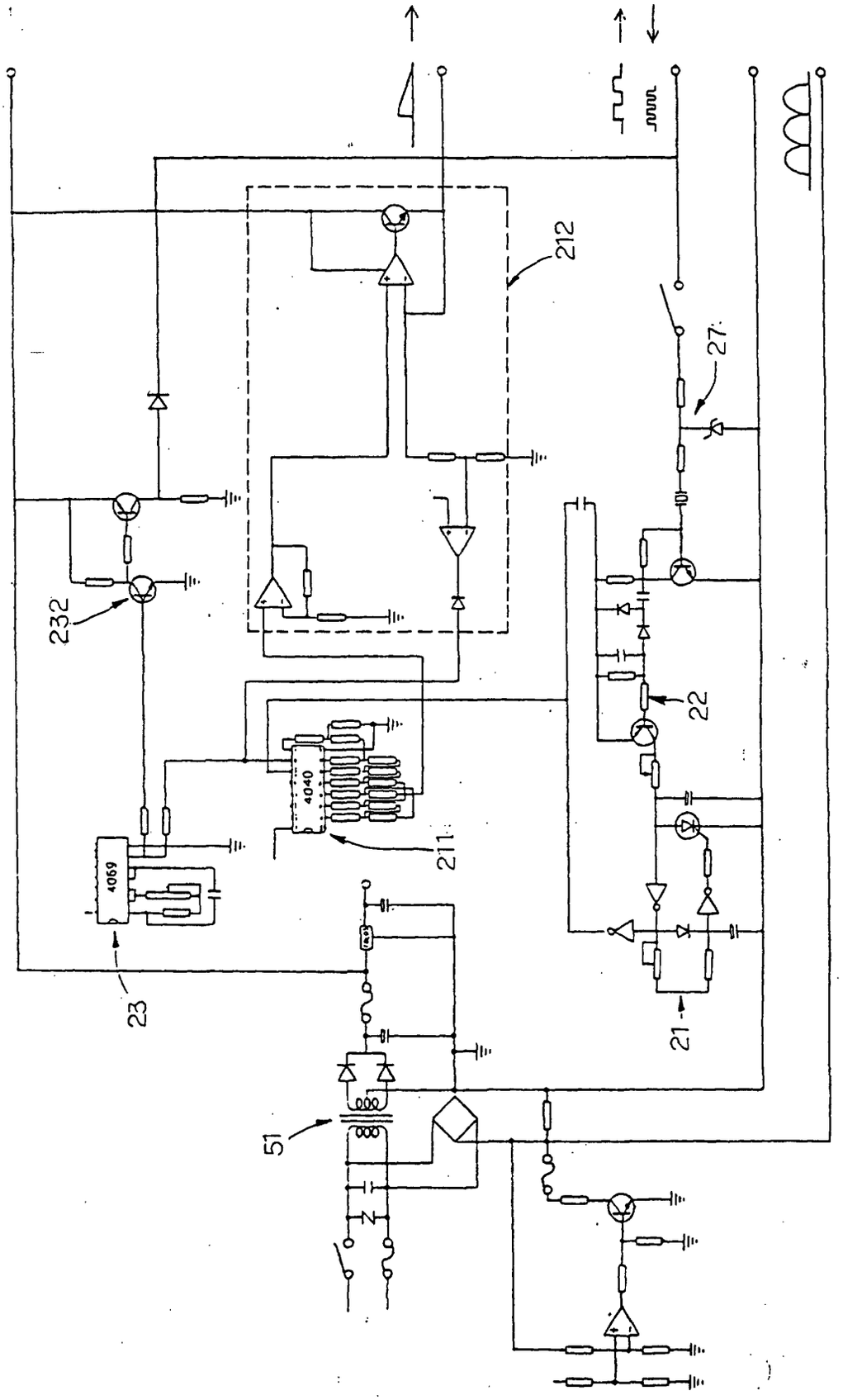

FIG.4

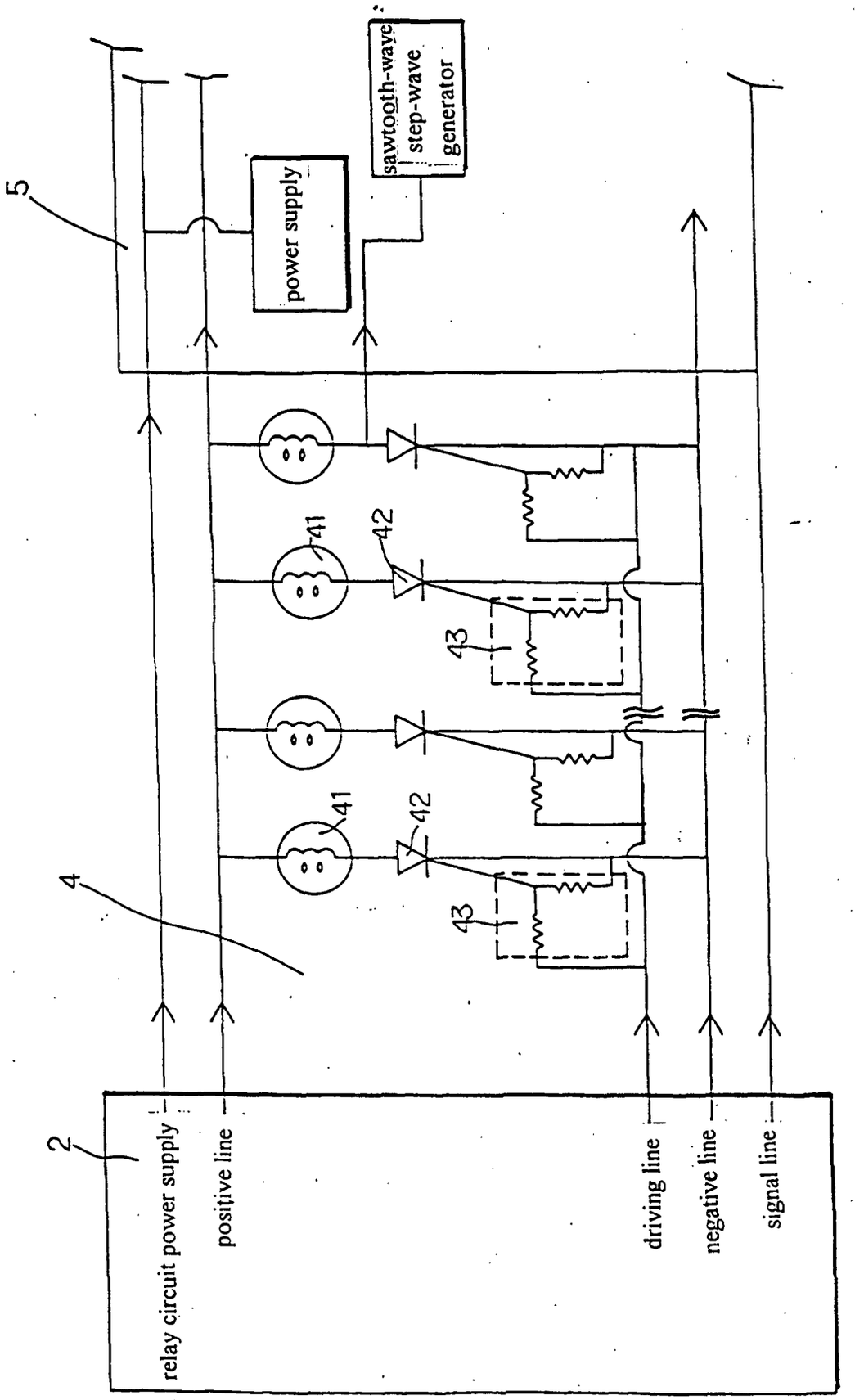
5
power supply
sawtooth-wave
step-wave
generator
41
42
43
4
2
relay circuit power supply
positive line
driving line
negative line
signal line

FIG.5

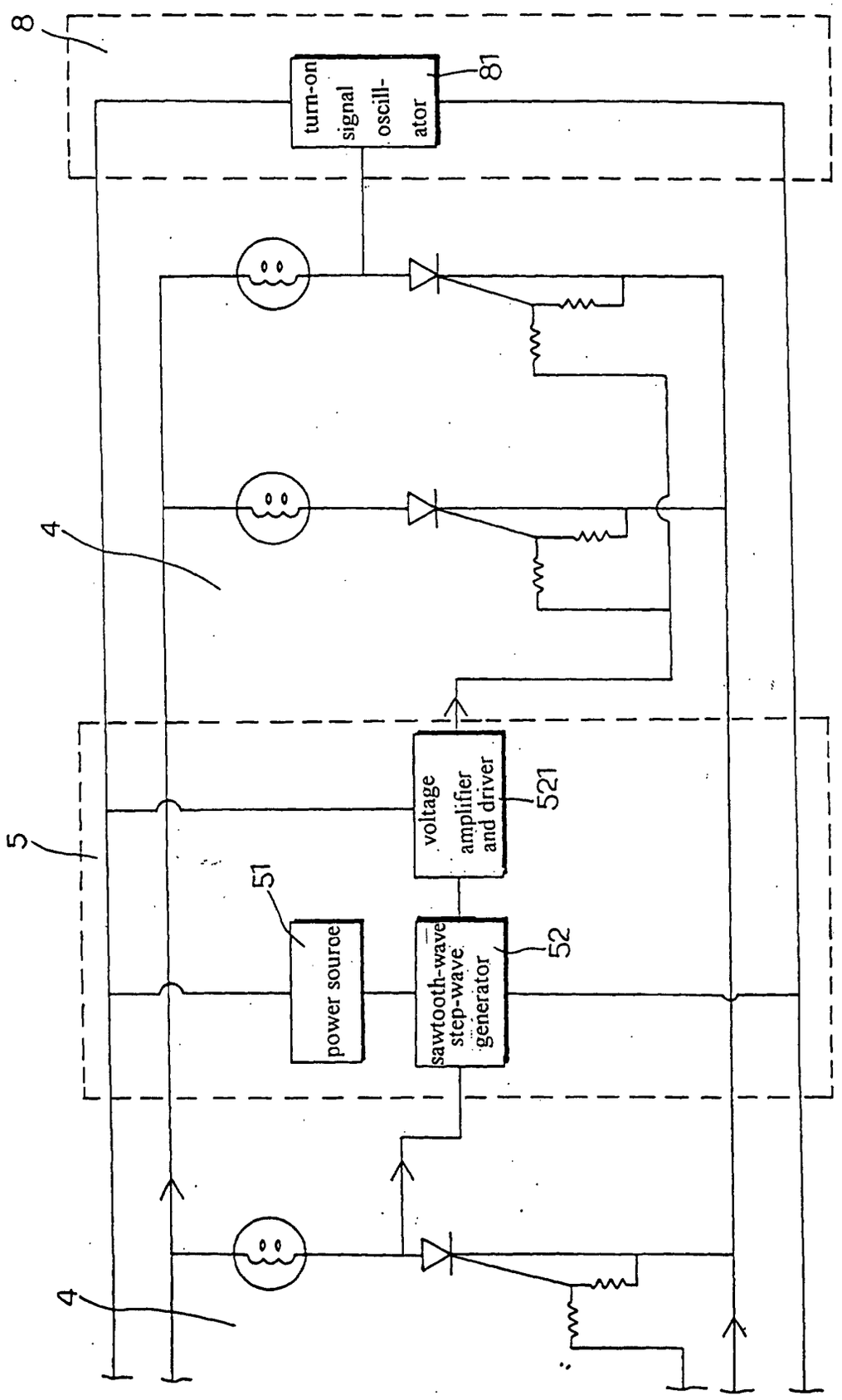
8
turn-on signal oscill-ator
81
4
5
voltage amplifier and driver
521
51
power source
sawtooth-wave step-wave generator
52
4

FIG.6

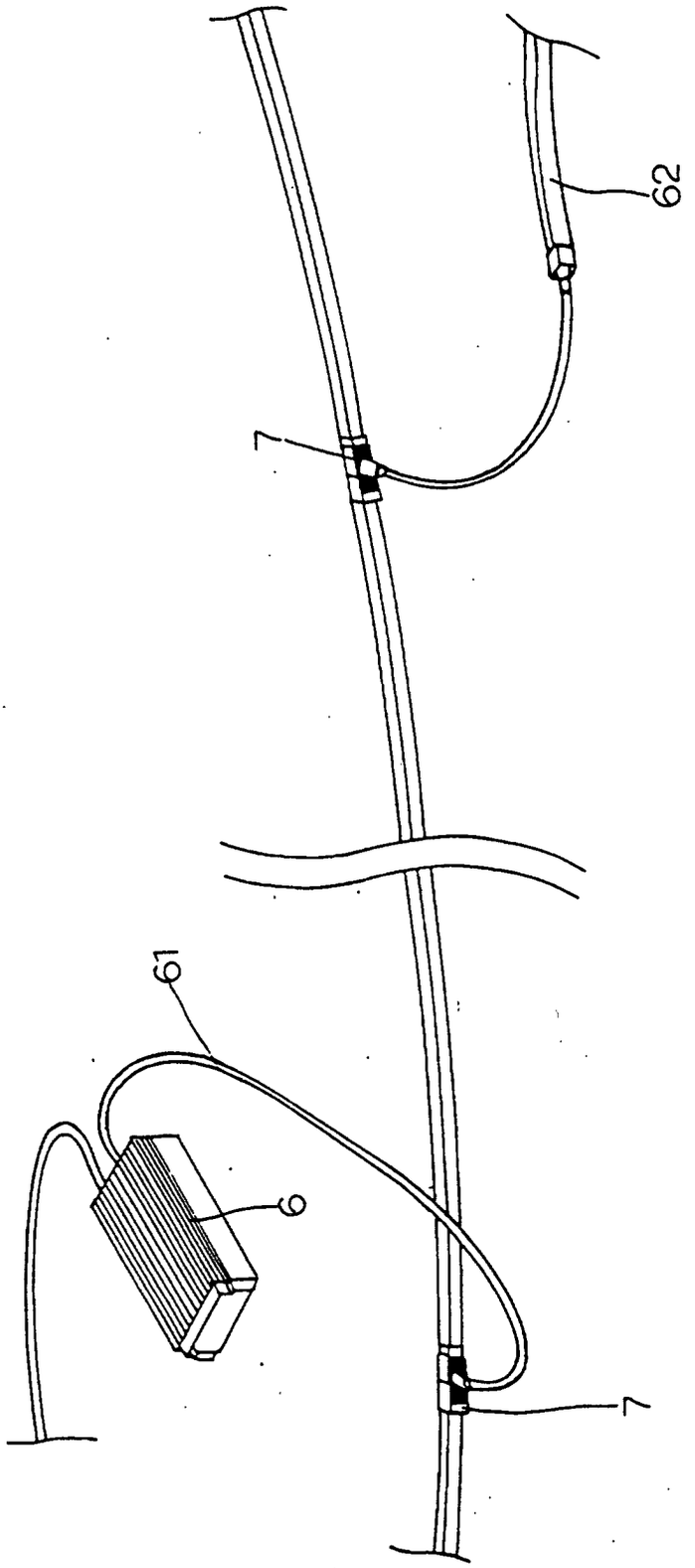

FIG.7

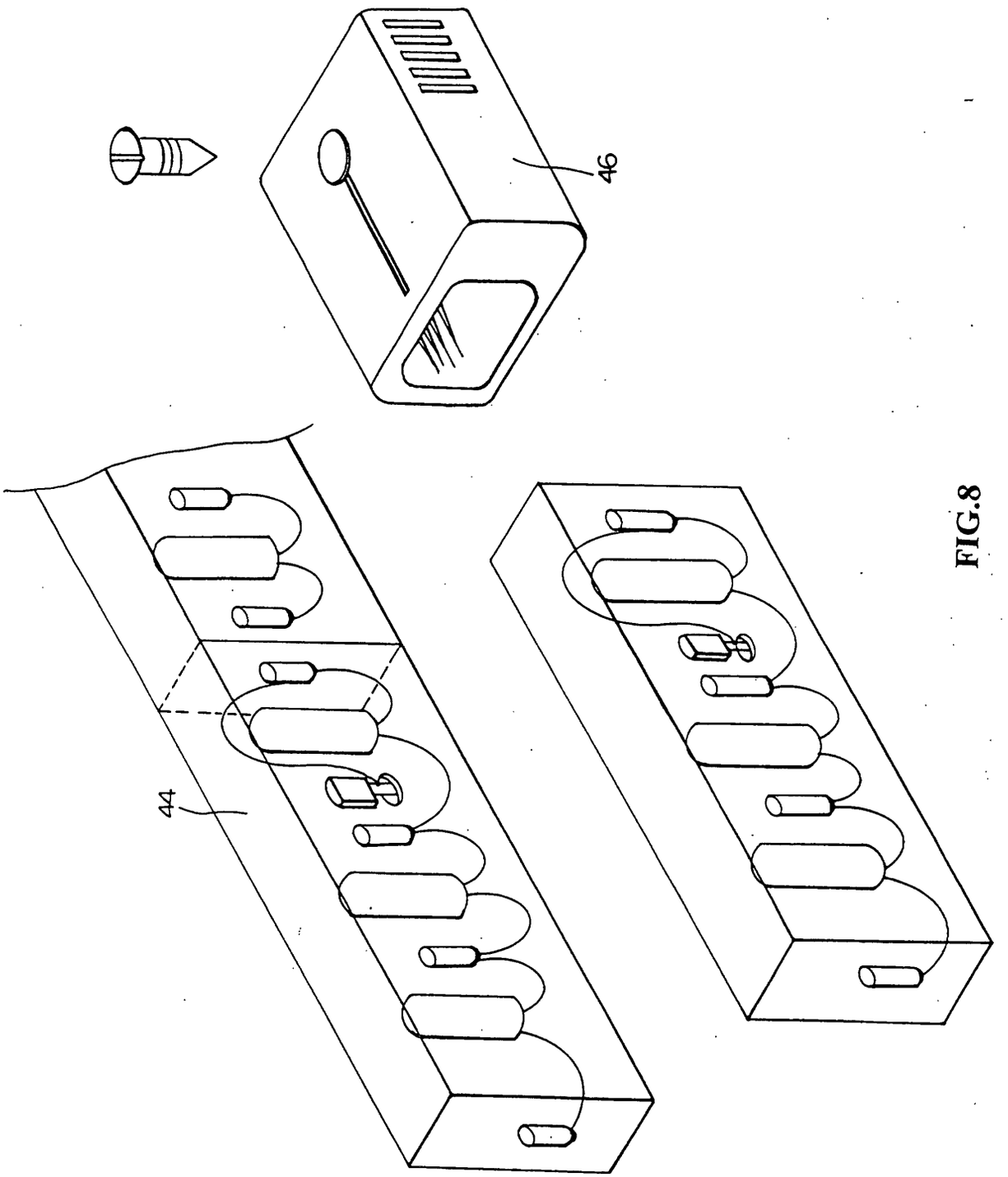

FIG.8

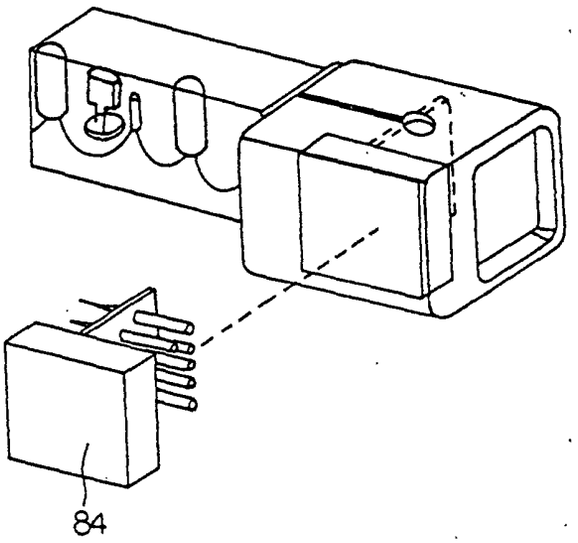

FIG.9

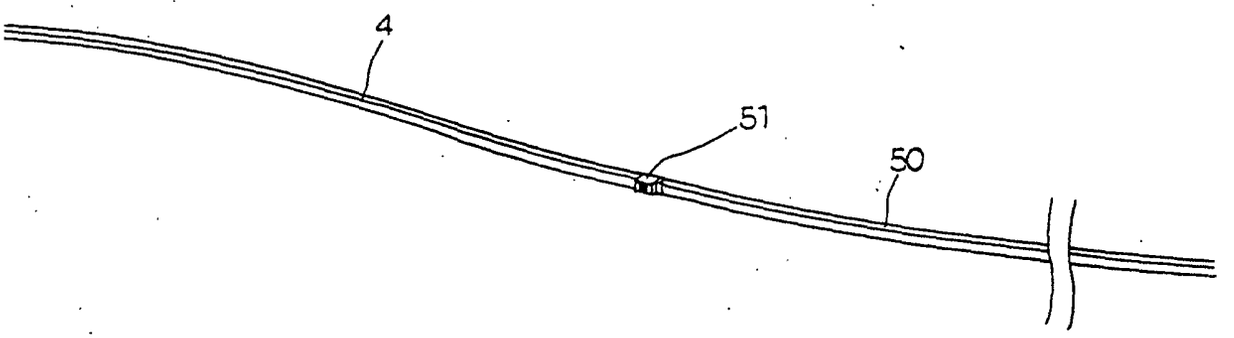

FIG.10

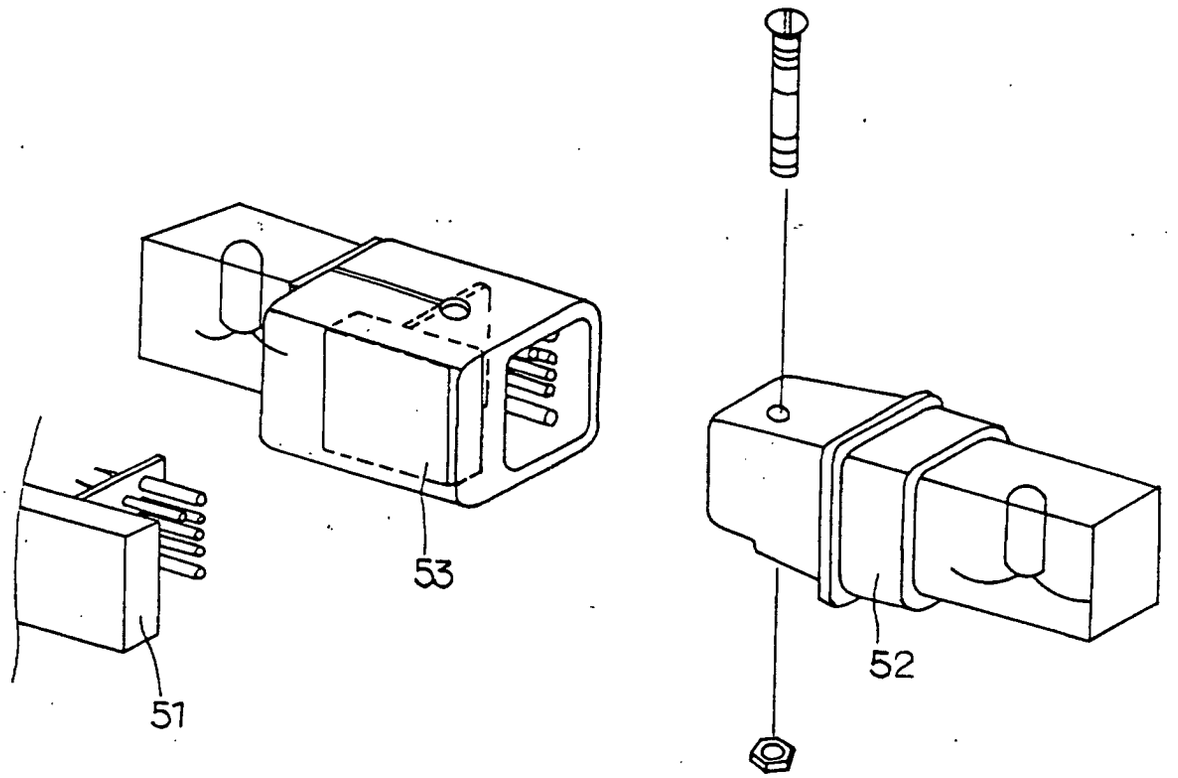

FIG.11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN99/00103

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6. H05B 37/02

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6. H05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, PAJ, CNPAT: Light string, Control, Sawtooth wave, Step wave.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB-A-2321805 (Lin Yuan), 05 Aug. ,1998 (05.08.98) Line 13, Page 3 -- Line 22,Page 4	1-5
X	CN 2294505Y (Lin Yuan), 14 Oct. ,1998 (14.10.98) Line26, Page 1-- Line 17, Page 3	1-5

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 April, 2000 (28.04.00)	04 MAY 2000 (04.05.00)
Name and mailing address of the ISA/CN 6 Xitucheng Rd., Jimen Bridge, Haidian District, 100088 Beijing, China Facsimile No. 86-10-62019451	Authorized officer Guo, Fenglin Telephone No. 86-10-62093810

Form PCT/ISA /210 (second sheet) (July 1998)