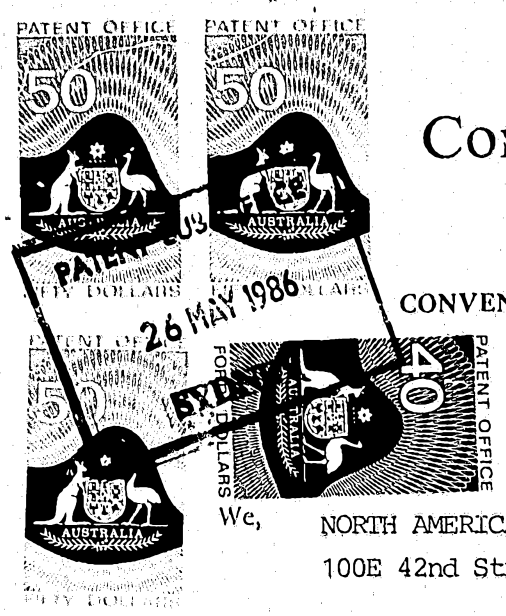

592991

PHA 40 484

Commonwealth of Australia

Patents Act 1952

CONVENTION APPLICATION FOR A STANDARD PATENT

We, NORTH AMERICAN PHILIPS CONSUMER ELECTRONICS CORP.
100E 42nd Street,New York,N.Y.10017,U.S.A.

hereby apply for the grant of a Standard Patent for an invention entitled:

"Universal remote control unit".

APPLICATION ACCEPTED AND AMENDMENTS ALLOWED 16-11-89

which is described in the accompanying complete specification. This application is made under the provisions of Part XVI of the Patents Act 1952 and is based on the following application or applications for a patent or patents or similar protection made in the following country or countries on the following date or dates:

in U.S.A. , appl. No. 739,357 , filed May 30th,1985
in ..... , appl. No. ..... , filed .....
in ..... , appl. No. ..... , filed .....

Our address for service is:

Philips Industries Holdings Ltd,
Patent and Trade Mark Division
The Philips Building, Blue Street,
North Sydney, New South Wales 2060, Australia.

Dated this 21st day of April, 1986

NORTH AMERICAN PHILIPS CONSUMER ELECTRONICS CORP.

By Jack Oisher
Jack Oisher

To: THE COMMISSIONER OF PATENTS.

OFFICE
26 MAY 1986
SYDNEY

PHA 40.484

COMMONWEALTH OF AUSTRALIA

Patents Act

DECLARATION FOR A PATENT APPLICATION

INSTRUCTIONS
(a) Insert "Convention" if applicable
(b) Insert FULL name(s) of applicant(s)

In support of the (a) "Convention" application made by
(b)
NORTH AMERICAN PHILIPS CONSUMER ELECTRONICS CORP.

(c) Insert "of addition" if applicable
(d) Insert TITLE of invention

(hereinafter called "applicant(s)") for a patent(c) for an invention entitled (d)
"Universal remote control unit"

(e) Insert FULL name(s) AND address(es) of declarant(s) (See headnote•)

I/~~We (e)~~ Jack Oisher
c/o 100E 42nd Street,New York,N.Y.10017,U.S.A.

do solemnly and sincerely declare as follows:

~~3. I am/We are the applicant(s).~~
~~(or, in the case of an application by a body corporate)~~

1. I am/~~We are~~ authorized to make this declaration on behalf of the applicant(s).

~~2. I am/We are the actual inventor(s) of the invention.~~
~~(or, where the applicant(s) is/are not the actual inventor(s))~~

(f) Insert FULL name(s) AND address(es) of actual inventor(s)

2. (f)
Robin Bernard RUMBOLT
of 1134 Glade Hill Drive,Knoxville,Tennessee 37919,U.S.A. and
William Russell McINTYRE
of 232 Newport Road,Knoxville,Tennessee 37922,U.S.A.

(g) Recite how applicant(s) derive(s) title from actual inventor(s) (See headnote••)

~~is~~/are the actual inventor(s) of the invention and the facts upon which the applicant(s) is/are entitled to make the application are as follows:

(g) The Applicant is the assignee from the said actual inventors by virtue of an assignment.

(Note: Paragraphs 3 and 4 apply only to Convention applications)

(h) Insert country, filing date, and basic applicant(s) for the/or EACH basic application

3. The basic application(s) for patent or similar protection on which the application is based is/are identified by *country, filing date, and basic applicant(s)* as follows:

(h)
in U.S.A.on 30th May 1985
by Robin Bernard RUMBOLT and William Russell McINTYRE

4. The basic application(s) referred to in paragraph 3 hereof was/were the first application(s) made in a Convention country in respect of the invention the subject of the application.

(k) Insert PLACE of signing
(l) Insert DATE of signing

Declared at (k) New York, U.S.A.
Dated (l) April 21 , 1986

(m) Signature(s) of declarant(s)

(m) .....
By: .....
Jack Oisher

Note: No legalization or other witness required

To: The commissioner of Patents

(12) PATENT ABRIDGMENT (11) Document No. AU-B-57916/86
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 592991

(54) Title
UNIVERSAL REMOTE CONTROL UNIT

International Patent Classification(s)
(51)[4] G08C 017/00

(21) Application No. : 57916/86 (22) Application Date : 26.05.86

(30) Priority Data

(31) Number	(32) Date	(33) Country
739357	30.05.85	US UNITED STATES OF AMERICA

(43) Publication Date : 04.12.86

(44) Publication Date of Accepted Application : 01.02.90

(71) Applicant(s)
NORTH AMERICAN PHILIPS CONSUMER ELECTRONICS CORP.

(72) Inventor(s)
ROBIN BERNARD RUMBOLT; WILLIAM RUSSELL MCINTYRE

(74) Attorney or Agent
PHILIPS INDUSTRIES

(56) Prior Art Documents
US 4487947
EP 117121
EP 124331

(57) Claim

3. Apparatus for remotely controlling any selected one of a plurality of appliances manufactured by different manufacturers and responsive to control signals formatted in accordance with each manufacturer's format, comprising:

- read only memory means storing format-defining data for each of said manufacturers;
- user operable format selector means for addressing said read only memory means and accessing format-defining data of a given manufacturer stored therein;
- user controllable command signal generating means for generating command signals signifying a desired operation of said appliance;
- means for formatting said command signal in accordance with said given manufacturer's format-defining data; and

- means for transmitting control signals corresponding to the so-formatted command signal to said appliance.

PHA 40.484

592991

ORIGINAL

This document contains the amendments made under Section 49 and is correct for printing.

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952-1969

COMPLETE SPECIFICATION FOR THE INVENTION ENTITLED:

"Universal remote control unit".

The following statement is a full description of this invention, including the best method of performing it known to me:-

Universal remote control unit.

1. Field of the Invention

The present invention relates to remote control units and, particularly, to remote control units for controlling home appliances to carry out selected operations.

Background of the Invention

At present, many home appliances are available which can be remotely controlled by the user. For example, a television set can be turned on and off, a channel can be selected, a video cassette recorder controlled to play or record, etc. However, each manufacturer uses a different signal format to effect his control. Not only do different operations require different control signals, but the basic format, such as the bit timing, the number of bits per word, the width of the pulses, the modulating frequency, if any, applied to each pulse, the presence of, length of, and format of start, lead, or trailer pulses and the number of correct receptions of a particular command required to activate the appliance to carry out the selected operation varies from manufacturer to manufacturer. The basic format may also be different for different model numbers of the same manufacturer.

Many homes have appliances which can be remotely controlled, but which are manufactured by different manufacturers. Further, control of, for example, a video cassette recorder frequently requires the ability to control a related appliance, e.g. a television set, in conjunction therewith. At present, viewing a recorded program requires use of two individual remote control units, particularly if the recorder and the television set are not made by the same manufacturer.

Summary of the Invention

It is an object of the present invention to furnish a universal remote control unit which allows control of different types of appliances as well as appliances manufactured by different manufacturers.

The remote control unit is to be simple to operate, light, reliable, and relatively inexpensive.

In accordance with the invention, the user selects a particular category of appliance and its model number and/or manufacturer. Selecting the category automatically causes a display of commands available in the category, again for user selection. After the relevant selections have been made, the selection elements are automatically scanned under control of a microprocessor and an address signal is generated. This address signal allows readout from a storage of a product code signifying the required parameters, i.e. frequency, pulse width, pulse repetition rate, word length, etc. and the application of product code signals signals to a formatter unit. The latter energizes a transmitter section which transmits signals corresponding thereto to the controlled appliance, thereby causing the appliance to execute the command selected by the user.

According to the invention, use of the remote control unit can further be facilitated by permanent association of operation commands of one appliance with related operation commands of another. Thus, in a preferred embodiment, user selection of a VCR "play" command will automatically trigger the command switching the associated television set to the empty channel to be used for display, followed by the command setting the VCR to the "play" mode. This concept is referred to as command chaining herein.

In a further preferred embodiment, the user selectable operation commands for some appliance categories also automatically include commands associated with a related category. For example, television volume controls are available upon selection of the VCR categorie.

The present invention, as well as additional objects thereof, will be better understood upon reference to the following description taken in connection with the accompanying drawing.

Brief description of the drawing

Figure 1 is a block diagram of the remote control unit according to the present invention;

Figure 2 is a schematic diagram of the stand-by circuit;

Figure 3 is a flow chart for the microprocessor of

Figure 1;

Figure 4 is a schematic diagram illustrating the keyboard mechanism of the present invention; and

Figure 5 is a schematic diagram of an infrared drive circuit.

Description of the preferred embodiments

In the schematic diagram of Figure 1, a microprocessor which is the central control unit for the system is denoted by reference numeral 10. The timing of microprocessor 10 is controlled by crystal time base 12. The basic microprocessor function is to receive data from three user-controlled selecting devices and to energize an infrared transmitting system to transmit signals with a format selected in accordance with this information. The transmitted infrared radiation is then received by the appliance and causes it to operate as desired by the user.

In the preferred embodiment, the microprocessor is Hitachi HD6301 operated in mode 6 with an oscillator frequency of 4 MHz and an instruction cycle time of 1 microsecond. This speed is necessary in order to generate the carrier output frequencies of up to 55 KHz required by some IR control systems.

The first of the user-operated selection devices is a category selector switch 14, by which the user selects the category of the appliance which is to be controlled. Its output is connected to microprocessor 10 through five lines 16. In the example illustrated in Figure 1, the following categories are provided: a television receiver (TV), a video cassette recorder (VCR) a disc player (disc), an audio system (audio), and an auxiliary input (aux) suitable, for example, for controlling a cable converter.

The second selection device is a keyboard 18. As will be described in greater detail with reference to Figure 4, category selector switch 14 is mechanically coupled to an escutcheon slider which moves in conjunction with the movement of the category selection switch to "illuminate" legends indicating specific commands associated with the selected categories in display windows or areas 20. Additional areas indicated by dashed lines and designated by reference numbers 20a display operation commands available for controlling an appliance

operationally associated with the appliance of the category selected by selector switch 12. For example, a television receiver is operationally associated with a video cassette recorder when the latter is in the "play" mode.

In the preferred embodiment, keyboard 18 is a 3x11 matrix, addressable by 11 address lines of a bus 22. Bus 22 is constituted by an eight line bus 24 activated by an address latch 26 and a four line bus 28 activated by microprocessor 10. Keyboard output is furnished on a three line bus 29.

Finally, two sets of dip switches, 30A and 30B, allow the user to identify the model number and/or manufacturer of the appliance to be controlled. The switches are addressed by a twelve line bus 30 also connected by busses 24 and 28.

Within each category, a number of appliance models is individually selectable in accordance with the following table which, however, is illustrative only:

Table I

1) TV	up to 64 formats	(6 dipswitches)
2) VCR	up to 8 formats	(3 dipswitches)
3) DISC	up to 4 formats	(2 dipswitches)
4) AUDIO	up to 8 formats	(3 dipswitches)
5) AUX	up to 4 formats	(2 dipswitches)
	88 formats	16 dipswitches

Also shown in Figure 1 is an electrically programmable read only memory (EPROM) 32. This memory contains look-up tables indexed by the category selector, the dipswitches, and the particular key pressed on the keyboard. Indexing takes place via addresses on a twelve line address bus 34 similar to bus 22. The data read out from the tables, including a product code and a command code, is then passed to the appropriate IR transmitter routine called a "formatter" also stored in EPROM 32. Each formatter is a device-specific program designed to generate the precise carrier frequency, pulse width, pulse modulation and overall timing format required by the particular device. EPROM 32 is also controlled by an address decoder 36 through a "selector" line and

an "output enable" line. The output of EPROM 32 is furnished on an eight line data bus 38 which connects to a bidirectional bus lines 42. Bus 42 interconnects microprocessor 10, address latch 26 and a tri-state buffer 44.

The input to address decoder 36 is a 4 bit address furnished by four lines from microprocessor 10. A latch enable line connects microprocessor 10 to address latch 26. Address decoder 24 also has an output connected via an "enable" line to buffer 44.

The data output lines from keyboard 16 are also connected to the inputs of a stand-by controller 30. A first and a second output of stand-by controller 30 is connected to a reset and stand-by input of microprocessor 10, respectively.

Finally, an output port 38 of microprocessor 10 is connected to IR driver circuit 40 which in turn drives infrared light emitting diodes (LED's) 42.

Address latch 26, when enabled, latches the address applied to it via bus 42 so that the latter may be used to transmit data to microprocessor 10.

Stand-by circuit 46 is shown in greater detail in Figure 2, wherein corresponding elements have the same reference numerals as in Figure 1. Specifically, it consists of an OR gate 210 having a three line input from bus 29. A timing circuit consisting of a resistor 512 and a capacitor 514 is connected to the output of OR gate 510. The common point of resistor 512 and capacitor 514 is connected to one input of an OR gate 516 whose second input is connected to a latch output of microprocessor 10. The output of OR gate 516 is connected to the reset and stand-by terminals of microprocessor 10.

Operation of the above-described equipment will now be described with reference to the flow chart of Figures 3A-D.

Referring to Figure 3A, upon inserion of the battery, microprocessor initialization takes place. A random access memory (RAM) in the microprocessor, the input-output ports, and a flag in the internal memory of the microprocessor are set to initial conditions. The microprocessor then enters the sleep mode. In this mode, stand-by circuit 46 grounds the reset and stand-by pins of the microprocessor. A circuit internal to the microprocessor shuts down all internal circuitry except for memory and the circuitry monitoring the "stand-by" and

"reset" lines. This state continues until a key of keyboard 18 is pressed.

Upon pressing of a key, OR circuit 510 receives an input, causing it to generate an output, charging capacitor 514. This, in turn, causes an output to appear at OR gate 516, energizing the "reset" and "stand-by" circuits in the microprocessor, and also energizing the output enable of latch 26. Monitoring of the stand-by and reset lines as well as the previously set flag causes the microprocessor to energize the latch for stand-by circuit 46 and to enable address latch 26.

The microprocessor then executes the keyboard scan. Specifically, the eleven rows of keyboard 18 and interrogated by bus 22 in a predetermined sequence. If a key on keyboard 18 is pressed, one of these rows is connected to its column, causing one of the lines of bus 29 to be at a high level at a specific step in the program. Buffer 44 is enabled by address decoder 36 to allow the information from keyboard 18 to be passed onto microprocessor 10.

The microprocessor then enters the subroutine shown in Figure 3B to determine which key (or keys) was pressed. Specifically, it is first determined whether the number of keys pressed is equal to 1 or greater than 1. If the number is greater than 1, it is determined whether the number is equal to 2. If the number is not equal to 2, i.e. if more than 2 keys have been pressed an unacceptable condition prevails and the program is aborted, a new scanning of the keyboard being initiated.

If two keys had been pressed, it is determined whether these are the record and play keys. It must be remembered that to activate the VCR to "record" both of these keys must be pressed. The category switch is then interrogated. This is an internal interrogation, since the outputs of switch 14 have been applied to the microprocessor. If the category is not either VCR or audio tape, the program is again aborted with resumption of keyboard scan. However, if the category switch does read either VCR or audio tape, the keyboard command is interpreted as a record command. Referring again to Figure 3A, the keyboard position number of the pressed key is then stored in an an internal random access memory (RAM) in the microprocessor. On the other hand, if the number of keys pressed is equal to 1 and the so-pressed key is the record key, the program aborts as mentioned above. If it is not

the record key and not the play key, the main program is resumed and the keyboard position number of the pressed key is stored in internal RAM. If it is the play key, the category switch is scanned. If the category is a category other than the VCR, the keyboard position number is again stored.

If, however, the category is VCR, the command chain illustrated in Figure 3C commences. First, the category number in the RAM is set to the number signifying "television". The dipswitches are then scanned in the same manner as described previously with respect to the keyboard scan. Data readout on bus 31 is applied to the microprocessor through bus 42, latch 26 again again carrying out its latching function. The dipswitch data is stored in RAM.

At this point, the microprocessor sends signals to the IR driver 40 causing it to send a command to the TV to switch it to the output channel of the VCR, e.g. channel 3. First, the key data in the RAM is set to zero. The "send" function is then executed. This is described in subroutine A, Figure 3D, which will be discussed in detail below.

After the command "0" has been sent, the key data in the RAM is set to "3". The send function is again executed. At the end of this particular send operation, the television has been switched to channel 3.

At this point, the category number in RAM is set to the VCR value. The key data is set to "play".

The system then returns to the main program illustrated in Figure 3A. The category switch is scanned and the result of the scan is stored in internal RAM. The scanning is controlled by a program in internal ROM. After the category switch data has been entered into RAM, the dipswitches are scanned, also under control of a program in internal ROM. The result of the scan is stored in the RAM of the microprocessor.

At this point, the microprocessor RAM contains data specifying the manufacture and model number of the device being controlled, the type of device it is and the key data, i.e. the data indicating the desired command.

The program then goes into the "send" mode illustrated in Figure 3D.

The program enters a "decode" routine located in internal

ROM. The stored category switch data, key data and dipswitch data is used to calculate the address of the command table in EPROM 32. The command table stores the following data for each associated key:

1. the command word bit pattern;
2. the formatter starting address;
3. the associated category type; and
4. a repeating or nonrepeating flag, i.e. a flag

signifying whether or not the command is to continue to be transmitted until the key is no longer depressed.

The category type found in the table is then checked against the currently selected category. A test is carried out whether they match. If not, the category data in RAM is replaced with the category data found in the table. For example, if the selected category is either disc or VCR, a TV command such as "volume up" will cause the "television" category to be stored in RAM.

If the two categories do match, the program jumps to the formatter starting address. The IR code is sent to the IR driver, i.e., the microprocessor acts in response to formatter instruction stored in EPROM to send the proper carrier frequency, type of code, timing, etc. to the IR driver. The keyboard is then scanned again. If the key is no longer pressed, the stand-by circuit is unlatched. If the same key is still pressed, a test is carried out as to whether the repeat flag is on. If the repeat flag is not on, no code is output; however, keyboard scan continues until the key is released. If the repeat flag is not on, the program loops back to the formatter starting address so that the IR code continues to be sent to the IR driver.

It should be noted that after the stand-by circuit is unlatched by microprocessor 10, the timing circuit consisting of resistor 512 and capacitor 514 of Figure 2 continues to hold the output of OR gate 56 high for a relatively short time since only a high impedance discharge path is available for the capacitor. Alternatively, latching and unlatching of the microprocessor control could be dispensed with, a timing circuit being provided which maintains the microprocessor in stand-by for a time period adequate to assure that the command has been carried out. For greater reliability, and because of the presence of chain commands, i.e. an automatic command sequence initiated for depression of a single button, a positive latch and unlatch by the

microprocessor is preferable.

Referring now to Figure 4, the construction of the keyboard-category selector switch combination will be described in detail. An opaque keyaboard cover 210 has translucent areas 212, 214 formed in the shape of letters or labels. One or more label is associated with each button or key. In the illustration, the labels associated with a button 216 are "on" and "off". In operation, the keyboard cover is positioned parallel to and in close proximity of the sliding escutcheon 218. The slider mechanism which moves the escutcheon relative to the opaque top layer of the keyboard is operated by a thumb wheel 220. The sliding escutcheon carries a first and second contrasting color, i.e. contrasting to the color of the top layer, and, inbetween the two contrasting colors, a color which is the same as that of the top layer. In the position illustrated, the first contrasting color is underneath the "off" label. This label would thus be "lit".

Thumbwheel mechanism 220 is activated by the user to select the category of appliance to be controlled, i.e. thumbwheel 220 controls the position of category selector switch 14 of Figure 1. The same button can thus be used for different commands, depending upon the selected category. For example, pressing a given button may turn a VCR off, or turn a television set on.

The IR driver circuit illustrated in Figure 5 is a standard driver circuit illustrated her for completeness only. It consists of a first amplifier stage including a transistor 610 having an emitter resistor 620 and a collector resistor 630. Three diodes 640 are connected in parallel with resistor 630. The collector of transistor 610 is connected to the base of a second transistor 650 connected as an emitter follower. Two light emitting diodes 660 are connected in the emitter circuit of transistor 650. The light emitting diodes emit infrared radiation under control of signals applied to the base circuit of transistor 610 by microprocessor 10.

Although the invention has been illustrated in a particular preferred embodiment, it is not intended to be limited thereto. Many variations in operation and construction will readily occur to one skilled in the art and are intended to be encompassed in the invention as set forth in the following claims.

Appendix to Figures 3A, 3B, 3C, 3D

Reference number	Inscription
300	insert battery
301	µp initializes set flag
302	enter sleep mode
303	standby circuit checks for any keyboard key pressed
304	any key pressed
305	standby circuit activates "reset" and "standby" lines on µp. µp reinitializes
306	µp executes keyboard scan program in internal ROM
307	determine which key(s) was pressed
308	store keyboard position number of key pressed in internal RAM
309	read category switch store result in internal RAM
310	read dipswitch store result in internal RAM
311	multi key patch (Figure 3B)
312	# of keys pressed
313	# = 2?
314	are they record + play?
315	read category switch
316	category = VCR or audio tape?
317	set keyboard data = record
318	is it record key?
319	is it play?
320	read category switch
321	category = VCR?
322	set category number in RAM = TV value
323	read dipswitch + store in RAM
324	set key data = "0"
325	execute "send" functions
326	set key data = "3"
327	execute "send" functions
328	set category number in RAM = VCR value

```
    329     set key data = "play"
    330     using stored category switch data and dipswitch
            data calculate address of command table in
            external EPROM
    331     using command table address and key position
            number get formatter address and data  out of
            command table
    332     check currently selected category against
            category type found in table
    333     do they match?
    334     replace category data in RAM with category data
            found in table
    335     jump to formatter starting address. Execute
            instructions to send IR code to IR driver
    336     scan keyboard
    337     same key still pressed?
    338     unlatch standby circuit
    339     repeat flag on?
```

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Apparatus for generating appliance control signals for remote control of a plurality of appliances of a given category but manufactured by different manufacturers, comprising:

- read only memory means having pre-stored data comprising product code, command code and formatting data for each of said appliances pre-stored at addressable memory locations;
- selection means for generating an appliance address signal addressing a memory location in said read only memory means associated with the product and command code of one of said plurality of appliances;
- means for applying said appliance address signal to said memory means, whereby said read only memory means furnishes read out signals corresponding to said pre-stored formatting data associated with said product and command code of said appliance address signal; and
- transmitting means for receiving signals corresponding to said read out signals, and for transmitting appliance control signals in response thereto toward at least a selected one of said appliances for controlling the operation thereof.

2. Apparatus for remotely controlling via control signals aan appliance of a given appliance category made by a given manufacturer, comprising:

- memory means storing format-defining data for said appliance category for each of a plurality of manufacturers including said given manufacturer;
- user controllable command signal generating means for generating a command signal signifying a desired operation of said appliance;

AUSTRALIAN PATENT OFFICE

- user controllable means for selectively accessing said format-defining data of said given manufacturer in said memory means;
- formatted signal generating means for formatting said command signal in accordance with said given manufacturer's format-defining data, thereby creating a formatted signal; and
- transmitting means coupled to said formatted signal generating means for transmitting to said appliance control signals corresponding to said formatted signal for controlling the operating of said appliance.

3. Apparatus for remotely controlling any selected one of a plurality of appliances manufactured by different manufacturers and responsive to control signals formatted in accordance with each manufacturer's format, comprising:

- read only memory means storing format-defining data for each of said manufacturers;
- user operable format selector means for addressing said read only memory means and accessing format-defining data of a given manufacturer stored therein;
- user controllable command signal generating means for generating command signals signifying a desired operation of said appliance;
- means for formatting said command signal in accordance with said given manufacturer's format-defining data; and
- means for transmitting control signals corresponding to the so-formatted command signal to said appliance.

4. Apparatus as set forth in Claim 2, wherein said given appliance category is one of a plurality of appliance categories to be controlled by said apparatus:

- further comprising category selector means for generating a selected category signal in response to user's activation thereof; and

PATENT OFFICE AUSTRALIA

- wherein said user controllable accessing means comprises selector means for generating a selected manufacturer's signal, microprocessor means for receiving said command signal, said selected category signal; and said selected manufacturer's signal and generating an address signal accessing said memory means in response thereto.

5. Unit for remotely controlling a plurality of appliances each belonging to a one of a plurality of appliances categories, each having a model number signifying a given model of a given manufacturer, each adapted to carry out a predetermined function upon receipt of a remote control signal having a predetermined format, comprising:

- transmitter means for transmitting remote control signals having formats corresponding to formatted command signals applied thereto;
- first user-operable selector means for generating a first selector signal signifying the selected one of said plurality of model numbers;
- second user-operable selector means for generating a second selector signal signifying the user selected one of said appliance categories;
- command select means for generating a command signal signifying one of said commands in response to user's selection thereof;
- means for generating an address signal in dependence on said first selector signal, said second selector signal and said command signal;
- memory means storing a plurality of product and command tables in individually addressable storage locations; and
- readout and formatting means for receiving said address signal and reading out product and command table data in said storage locations under control thereof, thereby creating readout product and command data signals, formatting said

AUSTRALIAN PATENT OFFICE

command data signals in accordance with said product data signals, thereby creating said formatted command signals, and applying said formatted command signals to said transmitter means, whereby said transmitter means transmits a remote control signal having the correct format to control the user-selected appliance to perform the user-selected operation.

6. A remote control unit as set forth in Claim 5, wherein:

- at least one additional command is associated with a predetermined one of said selected commands for transmission in a predetermined time relationship to the latter;
- wherein said readout means is operative under control of program means; and
- wherein said program means automatically controls said readout means to read out command table data associated with said selected and said associated commands in said predetermined time relationship upon receipt of an address associated with said predetermined one of said commands.

7. A remote control unit as set forth in Claim 6, wherein:

- said at least one of said predetermined selected commands is a VCR play command and said associated command is a TV channel switch command generated prior to said VCR play command.

8. A remote control unit as set forth in Claim 5, wherein:

- said user-selectable commands further comprise commands associated with an additional appliance category operationally associated with said selected one of said appliance categories.

AUSTRALIAN PATENT OFFICE

9. A remote control unit as set forth in Claim 8, wherein:

- said selected one of said appliance categories is the VCR category and said additional category is the television category.

10. A remote control unit substantially as described herein with reference to the accompanying drawings.

Dated this Nineth day of November, 1989.

NORTH AMERICAN PHILIPS CONSUMER ELECTRONICS CORP.

AUSTRALIAN PATENT OFFICE

46
18
20
29
44
20a
30a
30b
31
22
30
26
24
28
42
10
12
38
40
42a
32
34
36
14
40
TV
VER
DISC. PL.
AUDIO
AUX.
16

FIG. 1

FIG. 2

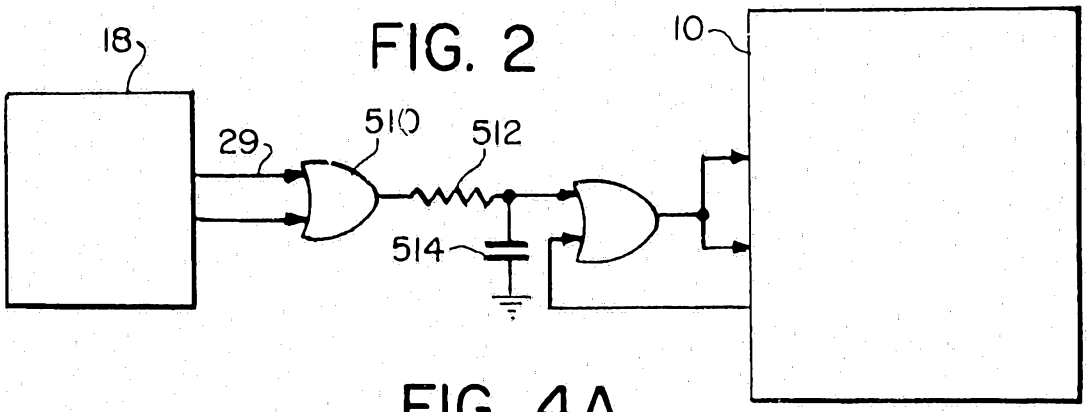

FIG. 4A

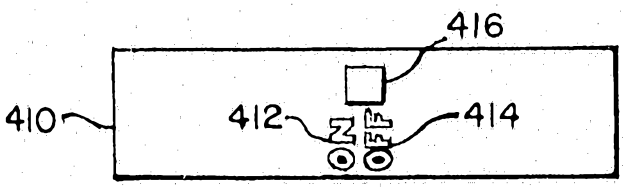

FIG. 4B

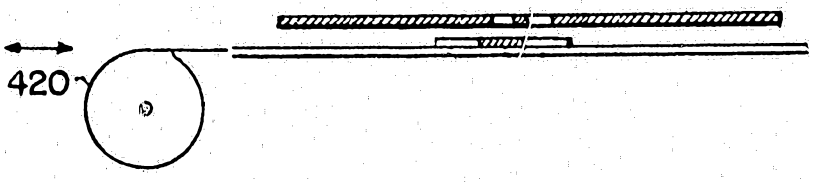

FIG. 5

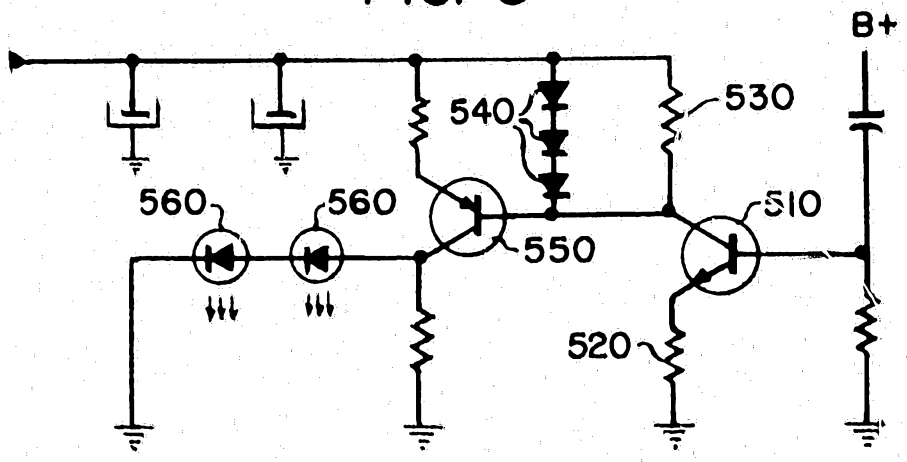

FIG. 3A

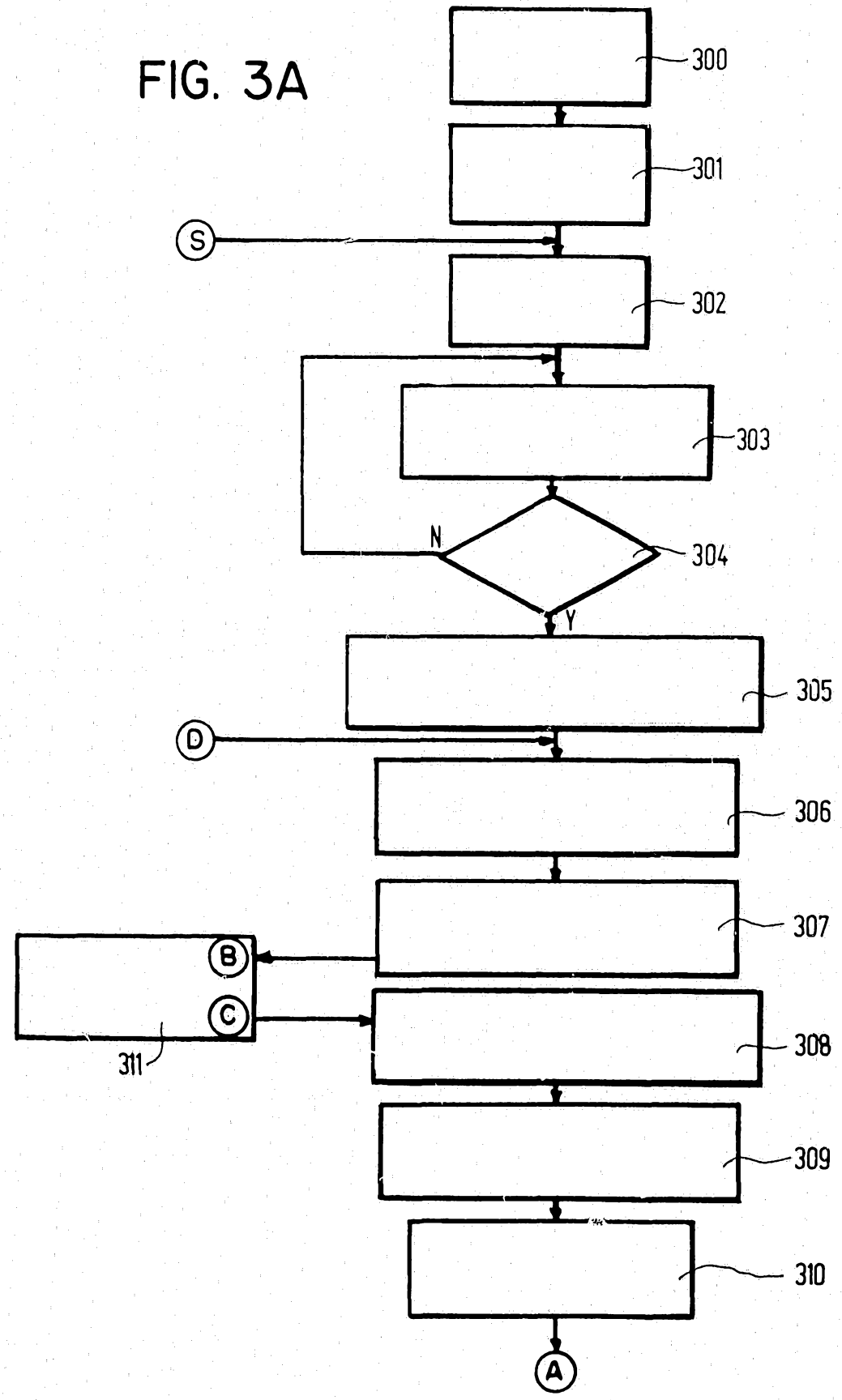

FIG. 3B

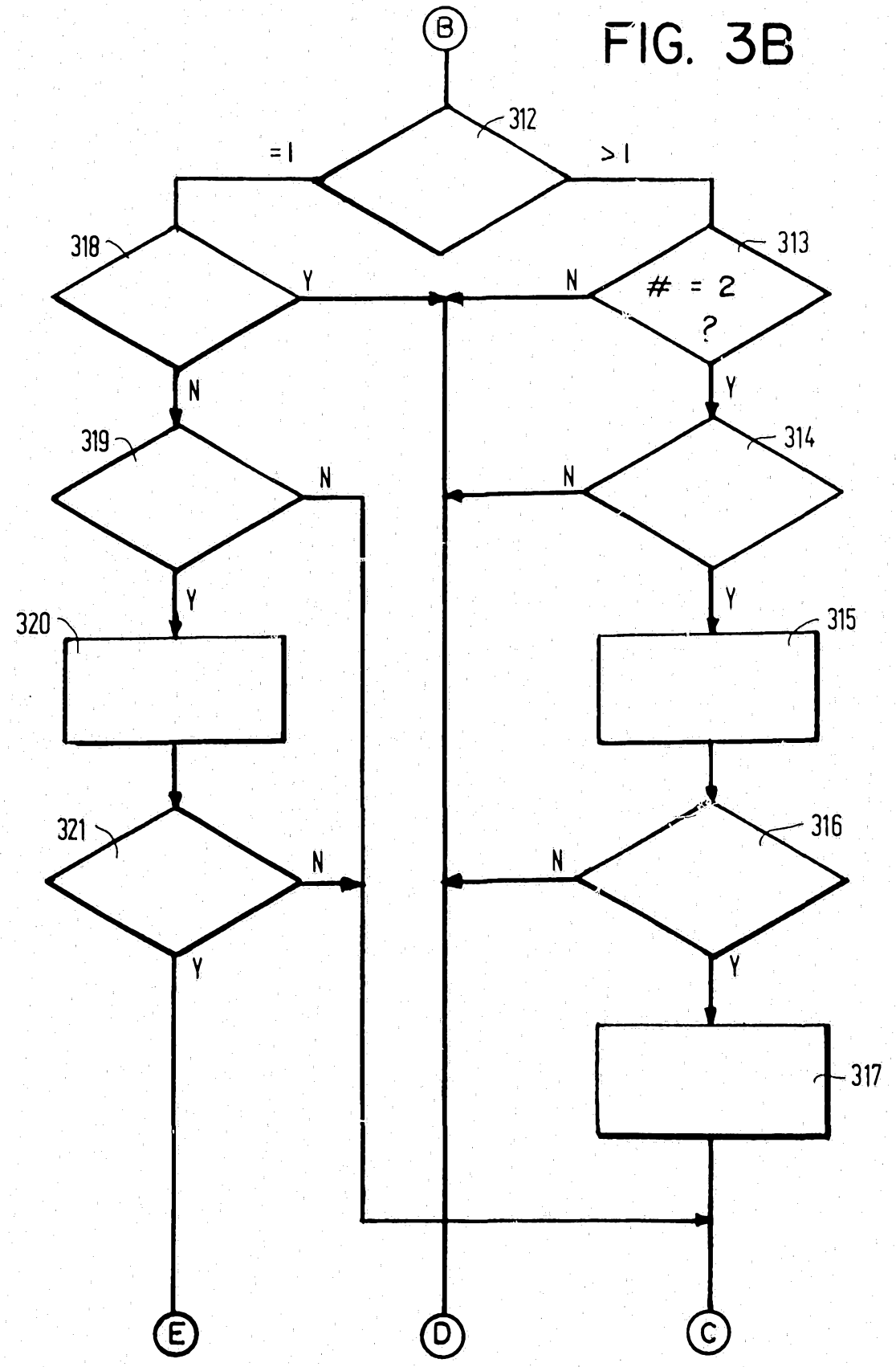

FIG. 3C

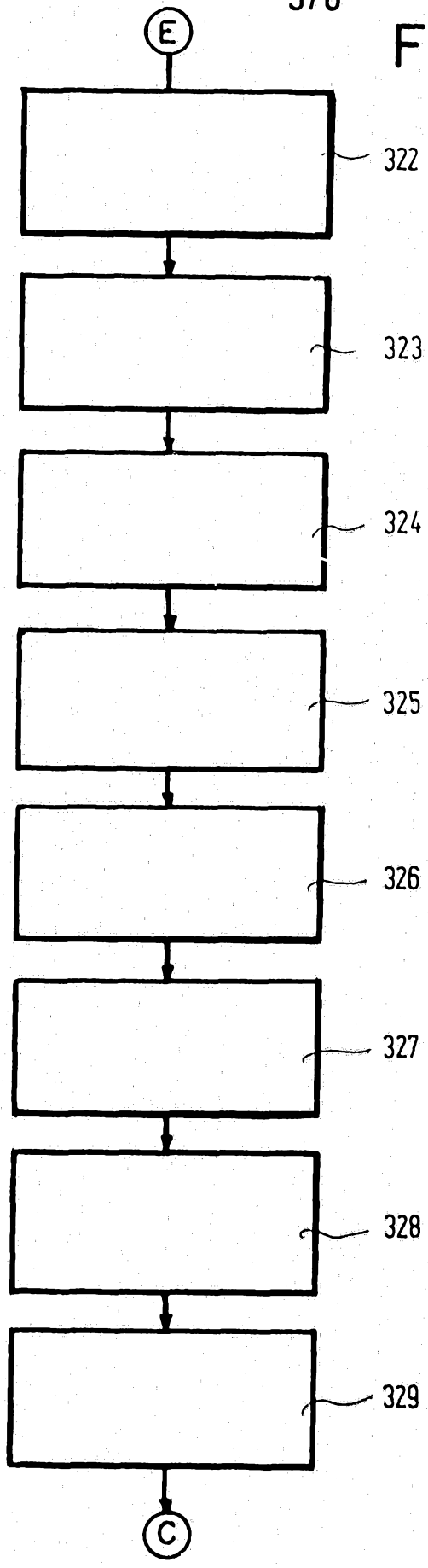
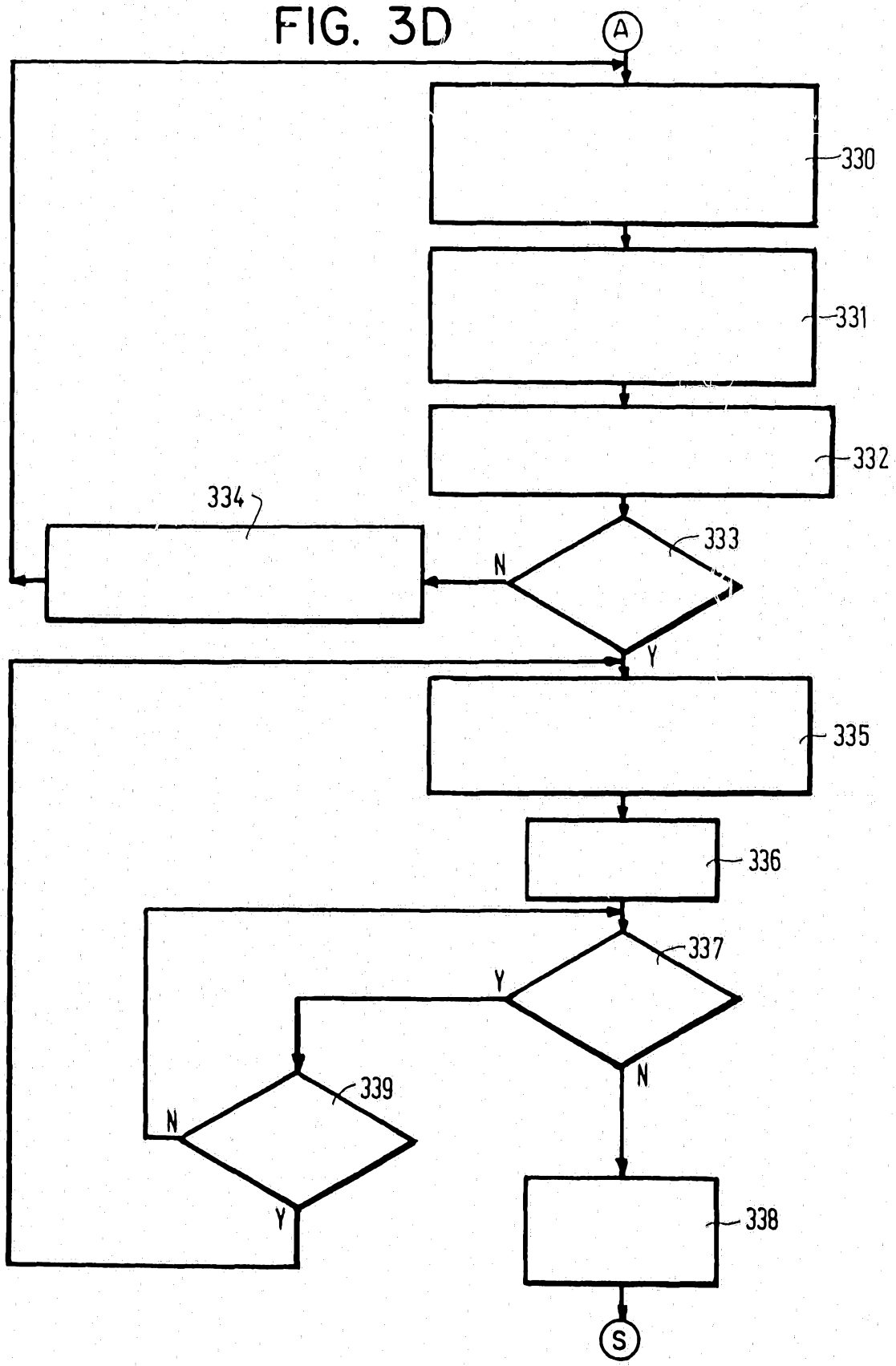
FIG. 3D