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GB 2064836 A US 4623970 A

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(54) Keyboard voicing device

(57) A self-contained module 1 which plugs directly between a computer 3 and keyboard 2 produces voice signals corresponding to key actuations and is useful for confirming keyboard input, as an aid for the blind and in education. The module comprises (Figure 3) keyboard and computer interfaces (13), a function-setting section (14), a controller (15), a voice integrated circuit (16) and a sound generating section (17).

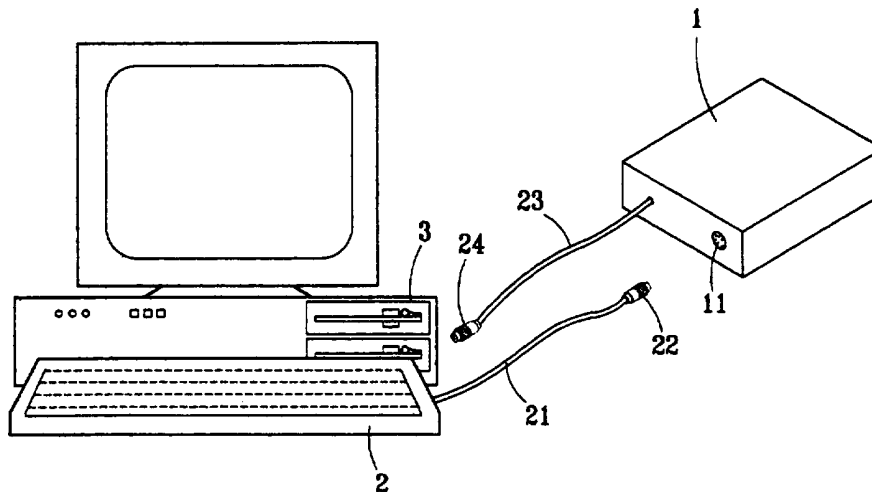


FIG. 1

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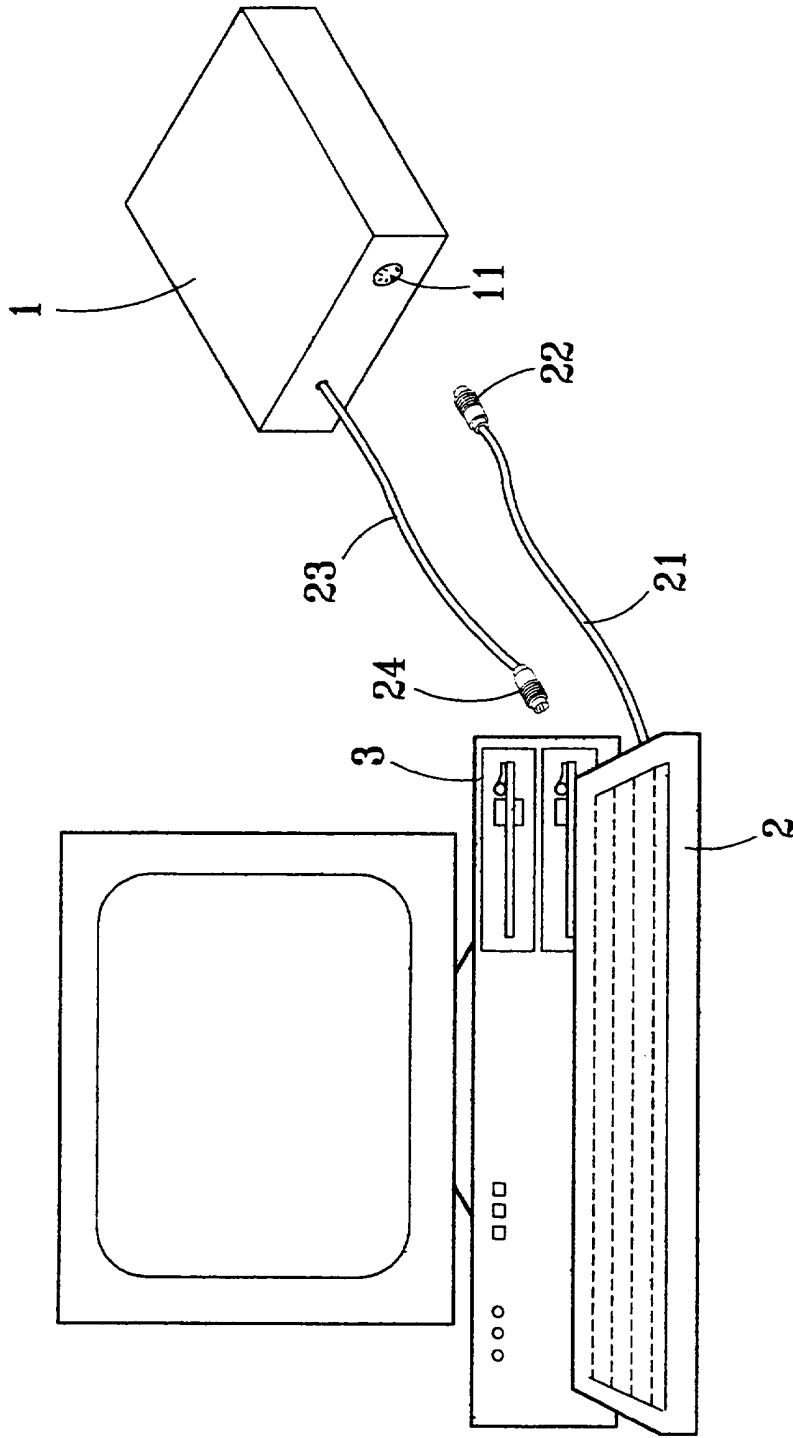


FIG. 1

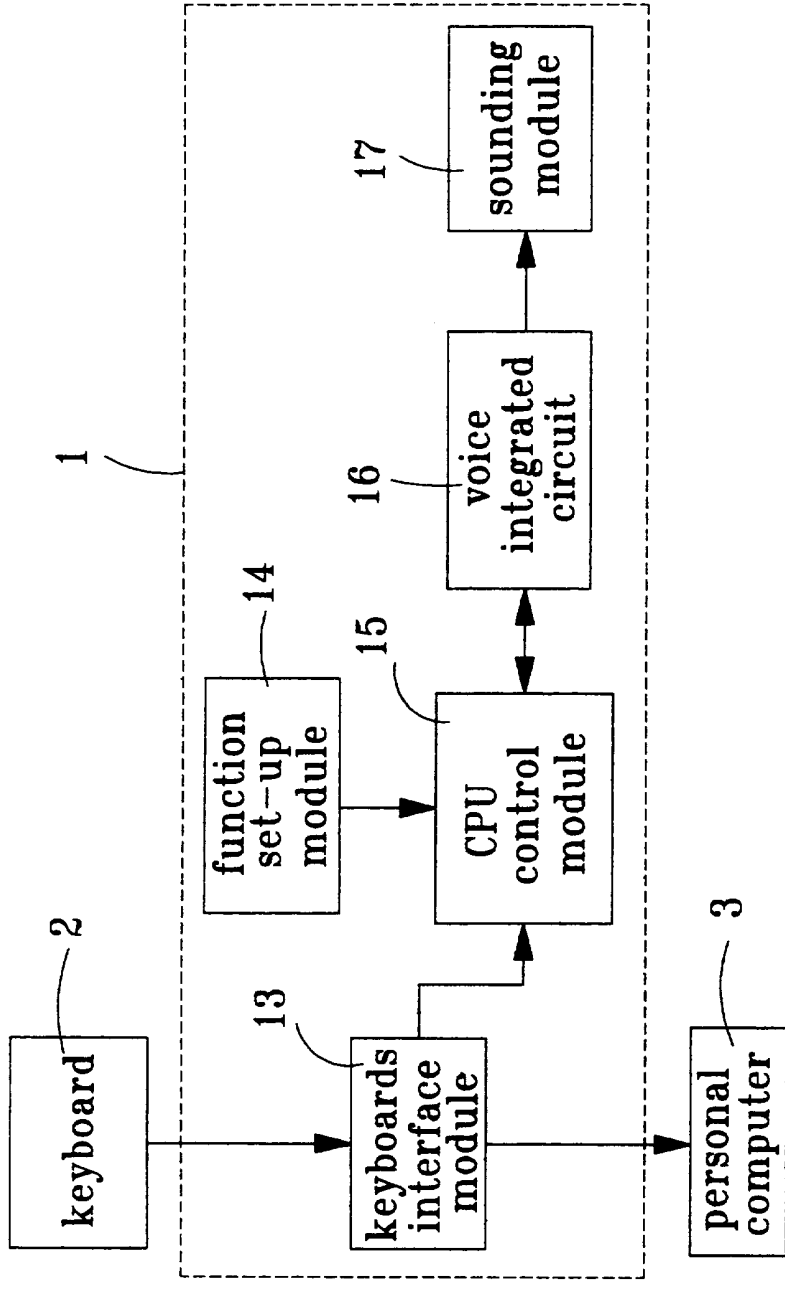


FIG. 2



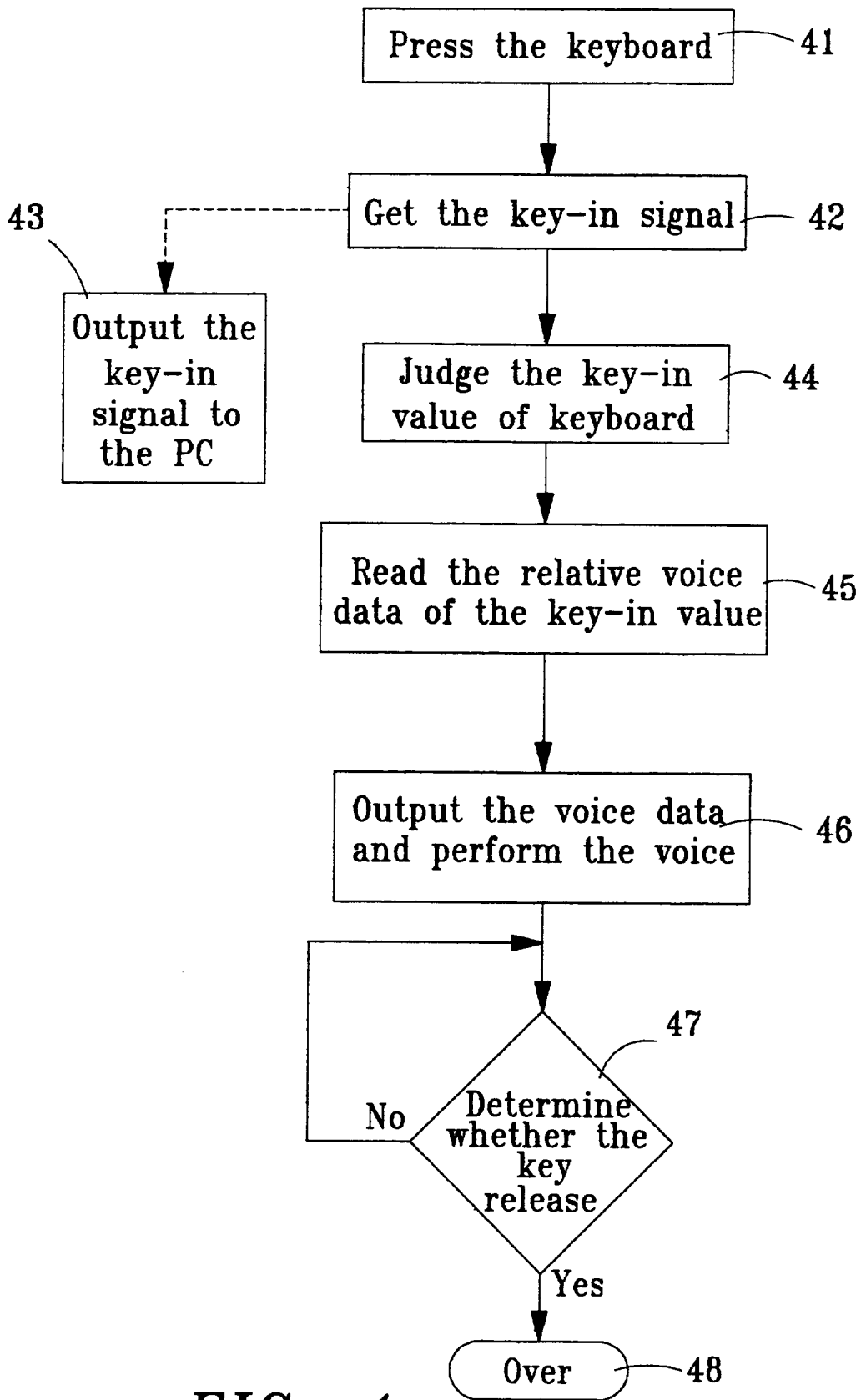


FIG. 4

## KEYBOARD VOICING DEVICE

This invention is a Keyboard Transformed Voice Device which is not  
5 necessary to be setting or controlled by computer. This device does not affect  
the operation of the personal computer, when you press a character via key  
board, at the same time, this device will perform a voice of the character.

Due to the advancement of Information Industry, computer becomes more  
10 popular in this world, and the peripherals of computer have even more advance.  
Currently keyboard is the most popular and practical input device of computer.  
However, for users, keyboard need to have big improvements on the accuracy,  
the convenience and the input speed of signal. As the link of computer and its  
peripherals, usually, any added device has to be set or controlled by personal  
15 computer. This methods is not only affecting the computer operation, but also  
has to renew the peripheral sooner than before, and cause the environmental  
protection problems.

Usually, keyboard use a cable to connect to the mother board of computer  
20 directly, and the computer mother board receives the signal from keyboard  
directly as an input control of computer. However, for users who are not  
familiar with the keyboard operation, the input speed will be slow, and feel not  
easy to operate. The major reasons are that users have to look back and forth  
on the screen, keyboard, and the manuscript, and can't concentrate their  
25 attention on data input, so the input status always stay in a ceasing state.  
Moreover, users are suspected the accuracy of the data input when they use  
keyboard to key-in data. When input a data, users have to judge the accuracy  
of the input, and to slow down the input speed. On the other hand, when the

blind key in data using keyboard, they can't detect the input error at once. This is an another defect and inconvenience of keyboard input.

5

This invention is focused on some problems of keyboard usage. This device is not necessary to be setting or controlled by computer; and also not affect the operation of personal computer to get the key-in signal from keyboard interface module, then input the signal to the CPU control module for  
10 analysis. After analyzed, it will output a signal to voice integrated circuit for process. The sounding module output the voice in order to achieve perform a voice as soon as the keyboard input a signal and as a function to identify the input signal. Therefore, provide an identify tool of keyboard input to users, and reduce the judge time when users key-in through the keyboard. Also it will  
15 provide a practicability and convenience for the blind. In addition, it provide the functions of both education and entertainment for children education. Besides, this device is not necessary to be set or controlled by computer; so you can install and operate this device without affecting the operation of the personal computer. You don't need to renew the old keyboard and achieve the  
20 environment protection purpose.

### **THE DRAWINGS :**

25 The invention, as well as its many advantages, may be further understood by the following detailed description and drawings in which:

**Figure 1.** The Schema of Keyboard Transformed Voice Device;

**Figure 2.** The Block Diagram of Keyboard Transformed Voice Device;

**Figure 3.** The Schematic of Keyboard Transformed Voice Device;

**Figure 4.** The Flow Chart of Keyboard Transformed Voice Device.

5

As refer to the Figure 1, this invention Keyboard Transformed Voice Device outer connection includes one keyboard (2) use a cable (21) with male connector (22), then this male connector (22) connects to the female connector (11). Then, through the Keyboard Transformed Voice Device (1) use the cable (23) connects to the male connector (24). Through the male connector (24) connects to the personal computer (3) in order to complete the basic connection structure between keyboard (2) and personal computer (3) in computer operation. The Keyboard Transformed Voice Device (1) is not set or controlled by personal computer (3), thus it will not affect the operation of computer, and users don't need to buy an extra or special keyboard. This device is easy installation and can be adjusted the position of voice output according to the need of users.

As shown in Figure 2, the circuits of this Keyboard Transformed Voice Device (1) include one keyboard interface module (13), one functions set-up module (14), one CPU control module (15), one voice integrated circuit (16) and one sounding module (17). The relationships between these circuits are followed:

- 25
1. Keyboard interface module (13) get the key-in signal from keyboard(2), then output the signal to personal computer (3) and to CPU control module (15) separately.

2. Functions set-up module (14) is as input signal to CPU control module (15) as functions expansion.
3. CPU control module (15) get the functions expansion signal from functions set-up module (14) for functions expansion. It also get key-in signal from keyboard interface module (13). After process, it output the data to the voice integrated circuit (16).
4. Voice integrated circuit (16) get the key-in data from CPU control module (15), then get the voice data from the relative address and output the voice data to sounding module (17); and
5. The sounding module (17) get the voice signal from voice integrated circuit (16) and perform the voice output.

15

The technical part of this invention is using the keyboard interface module, to get the key-in data from keyboard, and not affect the operation of personal computer; then output the key-in data to the personal computer and CPU control module separately. Additionally, using the CPU control module control the voice signal output from the voice integrated circuit, then the sounding module will perform the voice of key-in character.

20

As shown in Figure 3, this invention's schematic is illustrated as following:

1. Keyboard interface module (13) get the key-in data from keyboard(2), and go through the buffer amplifier (131) for output; then output the key-in signal to personal computer (3) through buffer amplifier (132), and output the signal to CPU control module (15) through buffer amplifier (133). The buffer amplifier will not be the

25

burden of the computer and keyboard, but can filter the noise signal and amplify the signal in order to stabilize the output signal.

2. Functions set-up module (14) uses switch (141) as signal input control for functions expansion of CPU control module (15).  
5
3. CPU control module (15) get the functions expansion signal from switch (141) for functions expansion. Also get the key-in signal from buffer amplifier (133) of keyboard interface module (13), then go through the process in CPU (151), and output the key-in data from the output pin RC0 through RC7 to the input pin D0 through D7 of voice integrate circuit (16).  
10
4. The voice integrated circuit (16) get the voice signal from CPU control module (15), then read the voice data from the relative address in the internal memory, and output the voice signal to the sounding module (17). However, this internal memory can be replaced by external memory as an alternative selection to an different voice for same key.  
15
5. Sounding module (17) get the output voice signal from voice integrated circuit (16), then go through transistor (171) as the voice control of speaker (172), and use the LED (173) as the indicator of output signal.  
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25

Referring to the Figure 4, the flow chart of this invention is described as following:

When press the keyboard (41), and get the key-in signal (42), then output the key-in signal to the personal computer (43) and judge the key-in value of keyboard (44). After read the relative voice data of the key-in value (45), output the voice data and perform the voice (46). Then, determine whether the key release (47), if the answer is "YES" then go over (48), or if the answer is "NO" then go back to determine whether the key release (47).

This invention consists following advantages:

- 10        1. When enter a character to the keyboard, at the same time, output the voice of the character. Thus, it provides an identify tool for keyboard input. Also this keyboard voice output provides more convenient and practical for blind to use computer. Moreover, it helps children education to achieve the functions of both education and entertainment
- 15        2. The installation of this invention is not required to be set or controlled by computer, and also can operate without affecting the operation of computer.
- 20        3. When install this invention, you don't need to renew your old keyboard or buy a special keyboard, thus can save users money and achieve the environment protection .

25        Many changes and modifications in the above described embodiment of the invention can, of course, be carried out without departing from the scope thereof.

In other word, the present invention provides a device arranged for connection between a keyboard and a computer to produce speech signals corresponding to key-input signals received from the keyboard. Speech synthesising circuitry is known, but this generally requires software to run, and  
5 may require additional circuitry in the host computer, so installation may be complicated, and the performance of the computer may be affected. The invention, on the other hand, may plug directly between an existing computer and keyboard, and operate substantially without affecting the operation of either the computer or the keyboard. The apparatus may use the same  
10 connectors as already fitted to the keyboard and computer (or be provided with adaptors), so installation can be simple, and operation of the device can be transparent to the computer; the device may have its own processing or control means so that voice signals are produced substantially without any processing by the computer. The control means may incorporate a look-up table containing  
15 voice data corresponding to each key-input signal.

The keyboard voicing device is preferably a substantially self-contained unit having a key-board input connector, and output connector for connection to a computer, and a speaker (although means may be provided to output the  
20 sound as electrical signals). Of course a power supply may be provided as a separate unit.

**CLAIMS:**

1. A keyboard voicing device arranged for connection between a keyboard and a computer comprising:

5 keyboard interface means arranged for connection to a keyboard to receive key input signals therefrom;

computer interface means arranged for connection to a computer to transmit key input signals thereto;

10 control and sounding means arranged to process said key input signals and to produce voice signals corresponding to said key input signals.

2. A keyboard voicing device according to claim 1 contained in a housing having a keyboard input connector for connection to a keyboard and an output connector for connection to a computer.

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3. A keyboard voicing device according to claim 2 wherein a speaker for producing audible sound from said voice signals is included in the housing.

- 20 4. A Keyboard Transformed Voice Device includes followings:

A keyboard interface module get the key-in signal from keyboard, then output the signal to personal computer and CPU control module separately.

25 A CPU control module get the key-in signal from keyboard interface module. After process, it output the signal to the voice integrated circuit.

A voice integrated get the key-in signal from CPU control module, then get the voice data from the relative address and output the voice signal to sounding module; and

- 5 A sounding module get the voice signal from voice integrated circuit and perform the voice output.

Using the keyboard interface module get the key-in signal from keyboard, and not affect the operation of personal computer; then output  
10 the key-in signal to the personal computer and CPU control module. Additionally, using the CPU control module control the voice signal output for voice integrated circuit, then the sounding module will perform the voice of key-in data.

- 15 5. As per the point 1 of claim said the Keyboard Transformed Voice Device, the CPU control module can add a functions set-up module to be the functions expansion signal input of the CPU control module.
6. As per the point 1 of claim said the Keyboard Transformed Voice Device,  
20 the keyboard interface module, CPU control module and voice integrated circuit can combine into one single module.
7. A keyboard voicing device substantially as herein described, with reference to the accompanying drawings.



Application No: GB 9514676.7  
Claims searched: 1-7

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Date of search: 2 October 1995

**Patents Act 1977  
Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.N): G4A ADT AKS

Int Cl (Ed.6): G06F 3/02 3/16

Other: On-line : WPI, INSPEC, COMPUTER

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	GB-2064836-A CANON See whole document	-
A	US-4623970-A TOYOMURA See whole document	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.