

660202

Section 29(1)

A U S T R A L I A

Patents Act 1990

NOTICE OF ENTITLEMENT

We, CIBERVEU, S.A., being the Applicant/Nominated Person in respect of Application No. 29465/92, state the following:

The Nominated Person is entitled to the grant of the patent because the Nominated Person would, on the grant of a patent for the invention to the inventors, be entitled to have the patent assigned to the Nominated Person.

The Nominated Person is entitled to claim priority from the application listed in the declaration under Article 8 of the PCT because the Nominated Person made the applications listed in the declaration under Article 8 of the PCT, and because those applications were the first applications made in a Convention country in respect of the invention.



(A member of the firm of DAVIES COLLISON CAVE
for and on behalf of the Applicant)

29 March, 1995



AU9229465

(12) PATENT ABRIDGMENT (11) Document No. AU-B-29465/92
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 660202

- (54) Title
CLINICAL THERMOMETER WITH DIGITAL AND VOCAL INDICATION
- International Patent Classification(s)
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| 9201462 | 14.07.92 | ES SPAIN |
- (43) Publication Date : 29.11.93
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- (71) Applicant(s)
CIBERVEU, S.A.
- (72) Inventor(s)
ANDRES URSUEGUIA BALBUENA; ARMANDO LAZARO CANTABRANA; CARLOS SALVADO USACH
- (74) Attorney or Agent
DAVIES COLLISON CAVE , 1 Little Collins Street, MELBOURNE VIC 3000
- (56) Prior Art Documents
FR 2644615
US 4428685
- (57) Claim

1. A clinical thermometer with digital and spoken displays, comprising: an input to which a sensor element is attached, the sensor being capable of reacting to variations in temperature, said sensor comprising a negative coefficient temperature (NTC) resistance, a conditioning block for the signals produced by the sensor, a microcontroller block which includes a microcontroller, a voice synthesiser module for generating analogue signals which produce intelligible sounds through a loudspeaker, and a display means for displaying measured values of temperature on a screen, characterised in that, the conditioning block for the signals produced by the sensor includes an RC charge network formed by a precision resistance, the negative coefficient resistance and a capacitor which are directly controlled by the microcontroller without the need of an analogue to digital stage between the sensor and the microprocessor stage.



(51) Clasificación Internacional de Patentes⁵ : G01K 13/00	A1	(11) Número de publicación internacional: WO 93/22639 (43) Fecha de publicación internacional: 11 de noviembre de 1993 (11.11.93)														
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> (21) Solicitud internacional: PCT/ES92/00070 (22) Fecha de presentación internacional: 29 de octubre de 1992 (29.10.92) (30) Datos relativos a la prioridad: <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">P 9200889</td> <td style="width: 30%;">28 de abril de 1992</td> <td style="width: 40%;">ES</td> </tr> <tr> <td></td> <td>(28.04.92)</td> <td></td> </tr> <tr> <td>P 9201462</td> <td>14 de julio de 1992</td> <td>ES</td> </tr> <tr> <td></td> <td>(14.07.92)</td> <td></td> </tr> </table> (71) Solicitante (para todos los Estados designados salvo US): CIBERVEU, S.A. [ES/ES]; Aribau, 162-166, E-08036 Barcelona (ES). (72) Inventores; e (75) Inventores/solicitantes (sólo US): URSUEGUIA BALBUENA, Andres [ES/ES]; LAZARO CANTABRANA, Armando [ES/ES]; SALVADO USACH, Carlos [ES/ES]; Aribau, 162-166, E-08036 Barcelona (ES). </td> <td style="width: 50%; border: none; vertical-align: top;"> (74) Mandatario: GONZALEZ GONZALEZ, Pablo; Consulpi, S.L., c/ Sants, 42, 08014 Barcelona (ES). (81) Estados designados: AT, AU, BG, BR, CA, CH, CS, DE, DK, ES, FI, GB, HU, JP, LU, NL, NO, PL, RO, RU, SD, SE, UA, US, Patente europea (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, SE). Publicada <i>Con informe de búsqueda internacional.</i> </td> </tr> </table>			(21) Solicitud internacional: PCT/ES92/00070 (22) Fecha de presentación internacional: 29 de octubre de 1992 (29.10.92) (30) Datos relativos a la prioridad: <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">P 9200889</td> <td style="width: 30%;">28 de abril de 1992</td> <td style="width: 40%;">ES</td> </tr> <tr> <td></td> <td>(28.04.92)</td> <td></td> </tr> <tr> <td>P 9201462</td> <td>14 de julio de 1992</td> <td>ES</td> </tr> <tr> <td></td> <td>(14.07.92)</td> <td></td> </tr> </table> (71) Solicitante (para todos los Estados designados salvo US): CIBERVEU, S.A. [ES/ES]; Aribau, 162-166, E-08036 Barcelona (ES). (72) Inventores; e (75) Inventores/solicitantes (sólo US): URSUEGUIA BALBUENA, Andres [ES/ES]; LAZARO CANTABRANA, Armando [ES/ES]; SALVADO USACH, Carlos [ES/ES]; Aribau, 162-166, E-08036 Barcelona (ES).	P 9200889	28 de abril de 1992	ES		(28.04.92)		P 9201462	14 de julio de 1992	ES		(14.07.92)		(74) Mandatario: GONZALEZ GONZALEZ, Pablo; Consulpi, S.L., c/ Sants, 42, 08014 Barcelona (ES). (81) Estados designados: AT, AU, BG, BR, CA, CH, CS, DE, DK, ES, FI, GB, HU, JP, LU, NL, NO, PL, RO, RU, SD, SE, UA, US, Patente europea (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, SE). Publicada <i>Con informe de búsqueda internacional.</i>
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P 9201462	14 de julio de 1992	ES														
	(14.07.92)															
(54) Title: CLINICAL THERMOMETER WITH DIGITAL AND VOCAL INDICATION (54) Título: TERMOMETRO CLINICO CON INDICACION DIGITAL Y HABLADA (57) Abstract The clinical thermometer is comprised of an input from a signal conditioner, which signals are generated by a sensor consisting of a negative coefficient resistance arranged to remain in contact with an area of the human body, a signal translating stage which is comprised of a capacity-resistance load network; a microcontroller which receives the information from the prior stages without having to effect an analog-digital conversion, an output being provided for a voice synthesizer which incorporates parasite suppressing filters and an amplifier stage for the sound signals appropriate to the application and an acoustical transducer such as a loud speaker; and an output for a digital display of the measured temperature. The circuit is designed as a compact arrangement which integrates the stages of conditioning the input signals coming from the probe, the microcontroller and the conditioner of low frequency signals provided to the loud-speaker, said circuit having incorporated a voice synthesizer, a measurement circuit and a microcontroller which sends the corresponding signals to the ideal modules formed by the circuit. Application to the visual and sound indication of the human body temperature. (57) Resumen Comprende una entrada procedente de un acondicionador de señales generadas por un sensor, constituido por una resistencia de coeficiente negativo, dispuesta para quedar en contacto con una zona del cuerpo humano, una etapa traductora de las señales que comprende una red de carga resistencia-capacidad; un microcontrolador que recibe la información de las etapas anteriores sin necesidad de efectuar una conversión analógico-digital, contando con una salida para un sintetizador de voz que incorpora filtros eliminadores de parásitos y una etapa amplificadora de la señales audibles, en orden a su aplicación y transductor acústico, tal como un altavoz; y una salida para un visualizador numérico de la temperatura medida. El circuito se construye en disposición compacta integrando las etapas acondicionadora de señales de entrada procedentes de la sonda, el microcontrolador y acondicionadora de la señales de baja frecuencia enviadas al altavoz, conteniendo dicho circuito integrado un sintetizador de voz, un circuito de medida y un microcontrolador que envía las señales correspondientes a los módulos ideales constituidos por el circuito. Aplicables a la señalización visual y sonora de la temperatura del cuerpo humano.																

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This invention relates to a clinical thermometer with digital and spoken display.

Clinical thermometers are known in the present state of the art, that incorporate a display for the measured temperature values, indicating the said values by means of figures, sometimes along with other indications. In some cases, the known models show legibility problems, specially at a certain distance and to people with sight problems, and this is specially true whenever LCD displays are used.

The temperature gauge to be herein disclosed is further characterised in that it is able to send out intelligible sounds corresponding to the words that indicate the temperature values, so that sightless people and other people with sight deficiency could use the thermometer with no need to read the values, but by only hearing perception of the said values. To this end, the electronic circuit of this new clinical thermometer includes a voice synthetizer that, at the same time the display shows figures corresponding to the thermal values measured, sends out sound signals which as a whole form words, also indicating the values measured by the device.

In the present patent the structure of a circuit is described on which the measuring device for the human body temperature is based, said circuit being connected, on the one hand, to a probe devised to be plac'd in contact with the human body, and on the other hand, to a speaker devised to provide signals corresponding to the temperature values, as well as a display designed to exhibit signs corresponding to the said values.

~~The proper circuit, represented in the block diagram accompanying the description of the patent, functionally includes~~



More specifically the invention provides a clinical thermometer with digital and spoken displays, comprising: an input to which a sensor element is attached, the sensor being capable of reacting to variations in temperature, said sensor comprising a negative coefficient temperature (NTC) resistance, a conditioning block for the signals produced
5 by the sensor, a microcontroller block which includes a microcontroller, a voice synthesiser module for generating analogue signals which produce intelligible sounds through a loudspeaker, and a display means for displaying measured values of temperature on a screen, characterised in that, the conditioning block for the signals produced by the sensor includes an RC charge network formed by a precision resistance,
10 the negative coefficient resistance and a capacitor which are directly controlled by the microcontroller without the need of an analogue to digital stage between the sensor and the microprocessor stage.

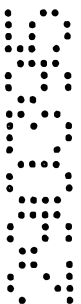
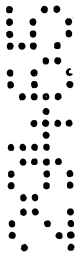
The thermometer of the invention can be embodied in several ways, one of them consisting of an assembly of discrete components duly built up, though, according to the
15 current physical constitution of electronic circuits, the integrated construction of said components is preferred, in which the components carry out the logic functions originating the operation of the device.

For better understanding of the above description, a drawing is attached in which a practical case of embodiment of the invention is shown, schematically and only as a
20 non-limiting example.

The drawing is a block diagram in which the stages designated with numerals correspond to the following parts of the circuit.

Block 1 consists of a thermal probe, that is, a device sensitive to the temperature level and fluctuations, providing an electrically measurable signal which is proportional
25 to the applied temperature. The probe includes an NTC or negative temperature coefficient resistor, characterised in that its ohmic value decreases as the applied temperature decreases. The system operates according to usage tables supplied by the manufacturer, so that the resistance-temperature ratio is simple and fast.

Block 2 carries out the conditioning of signals produced by the thermal probe and
30 translates the value of the NTC resistor into data directly processable by a microprocessor or a microcontroller built in the device. This circuit is based on a resistance-capacity loading network formed by a precision resistor, the NTC resistor and a capacitor.



This way the temperature is directly measured from the microcontroller, with no need to include an analog/digital converter in the device design. In addition, due to the method used, errors originating from the voltage drop of the batteries and by the condition of the capacitor are eliminated.

Block 3 makes up the microcontroller for the whole system, by means of which the temperature is measured, information is supplied to a set of quartz crystals built in the device, and data necessary to the voice synthesizer are also provided. The microcontroller is custom made and is based on a finite state machine, duly programmed to carry out the general operation algorithm of the thermometer and the communication with the several external modules (synthesizer, quartz crystals and NTC resistor).

Due to the technology used, synthesis module and liquid crystal interface module are physically integrated with the microcontroller, said technology being designated ASIC.

Block 4 ensures the conditioning of analog voice signals, including the filtering and amplification of the said signals. The module forming this stage is integrated into the above mentioned component.

Said stage 4 comprises, in accordance with the above mentioned, a set of filters to eliminate spurious signals that may have been reproduced in prior stages and includes voice synthesization, the signals of which, being of little amplitude, are magnified by an amplifier built in the same stage, providing the appropriate amplitude for driving the speaker forming stage 5. The latter, in a preferred embodiment, will be built in the thermometer housing.



Display 6 is of the LCD, easy perception type and it will show on screen values corresponding to, for instance, the human body temperature level at a given moment, the maximum and minimum values, and other information.

Amidst the functional parts forming the clinical thermometer disclosed in the original patent, three parts are invariable and indispensable: the probe for the immediate sensing of the thermal level of the human body, which is the magnitude to be measured; the speaker for the sending out of sound signals indicating the measured values, and the display for the visual exhibition of the values. These parts, therefore, will not be the subject of further considerations.

Functional parts defining the essentiality of the circuit forming the clinical thermometer according to the original patent constitute the subject matter of this Patent,

which contemplates the practical embodiment of the above mentioned parts.

The matter is, according to the appended claims, to make blocks 2, 3 and 4 of the diagram accompanying the description of the original patent in the form of a unique equivalent block, formed by an integrated circuit of the type called ASIC or specific for the foreseen application. Said circuit carries out the functions of the above mentioned blocks, with the advantage of simplification and size and weight reduction. The cost of the integrated circuit, even though this is made according to the specifications of the thermometer manufacturer, is also significantly reduced.

When analysing the functional structure of the unified block that now forms the main part of the thermometer constitution, the following subassemblies may be cited, bearing



in mind that distinction is merely formal and just in order to follow the input and output signals running, respectively.

1. A voice synthesizer based in ADPCM technology of 3 bits, allowing to obtain an audible frequency range resulting in a voice quality which is sufficient for the output stage. Said synthesizer is based on a 12 Kbytes memory containing the voice to be synthesized and a machine of synchronous states that directions the memory and coordinates the appropriate messages to shape the signs to be displayed, within a range of values from 32.0 to 42.0 centigrad degrees.

2. A measuring circuit based on a machine of synchronous states that uses digital signals to directly carry out the measurement on the NTC resistor associated to the probe. This allows to eliminate an interface for the analog/digital conversion.

3. A microcontroller, also based on a machine of synchronous states and serving to send the appropriate signals to every ideal module of the circuit, in order to carry out the algorithm or operation necessary for the case: starting of the device, measurement of the physical magnitude, feeding current applied to the voice synthesizer and to the sign display, as well as the disconnection of the device.

It is worthwhile to point out that the measurement method on the thermometer probe allows considering the input signal conditioner as a mere software routine, since there is no module devised to bring about the analog/digital conversion. The employed method uses directly the signals available in the microcontroller to carry out a frequency-temperature conversion. That is, there does not exist physically an A/D converter module in the integrated circuit that gathers the above mentioned functional stages.



Temperature measurement is done by computing the number of charges and discharges effected by the NTC resistor on a capacitor and referring it to the number of charges and discharges effected on a resistor of known value. From the resulting ratio the NTC value is obtained, and this value corresponds, according to a previously established table, to the temperature of the probe. This measurement method makes it possible to simplify at maximum the related module, as well as to obtain a measurement value which is stable in relation to changes in the feeding voltage (supplied by a set of batteries included in the device housing) and to differences in the ohmic value tolerances of the capacitor used.

A further advantage of the embodiment under description is the very small number of components directly involved with the measurement: just a capacitor, a low tolerance resistor and the NTC resistor associated to the probe.

In a preferred embodiment, the new temperature gauge will comprise a housing showing, in an easily accessible place, the thermal probe arrangement, able to be applied to the human body, the housing including as well the speaker compartment and a set of openings for the output of the generated sounds.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A clinical thermometer with digital and spoken displays, comprising: an input to which a sensor element is attached, the sensor being capable of reacting to variations in temperature, said sensor comprising a negative coefficient temperature (NTC) resistance, a conditioning block for the signals produced by the sensor, a microcontroller block which includes a microcontroller, a voice synthesiser module for generating analogue signals which produce intelligible sounds through a loudspeaker, and a display means for displaying measured values of temperature on a screen, characterised in that, the conditioning block for the signals produced by the sensor includes an RC charge network formed by a precision resistance, the negative coefficient resistance and a capacitor which are directly controlled by the microcontroller without the need of an analogue to digital stage between the sensor and the microprocessor stage.
2. A clinical thermometer as claimed in claim 1, wherein the microcontroller uses its digital signals to perform measurement directly on output from the conditioning stage.
3. A clinical thermometer as claimed in claim 1 or 2, wherein the microcontroller is operable, after computing temperature values based on output from the conditioning stage, to generate output signals which are coupled to said voice synthesiser module and said display means.
4. A clinical thermometer as claimed in claim 1, 2 or 3, wherein said conditioning block, said microprocessor and said voice synthesiser module are formed in a single integrated circuit.
5. A clinical thermometer substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 29th day of March, 1995

CIBERVEU, S.A.

By its Patent Attorneys

DAVIES COLLISON CAVE



ABSTRACT

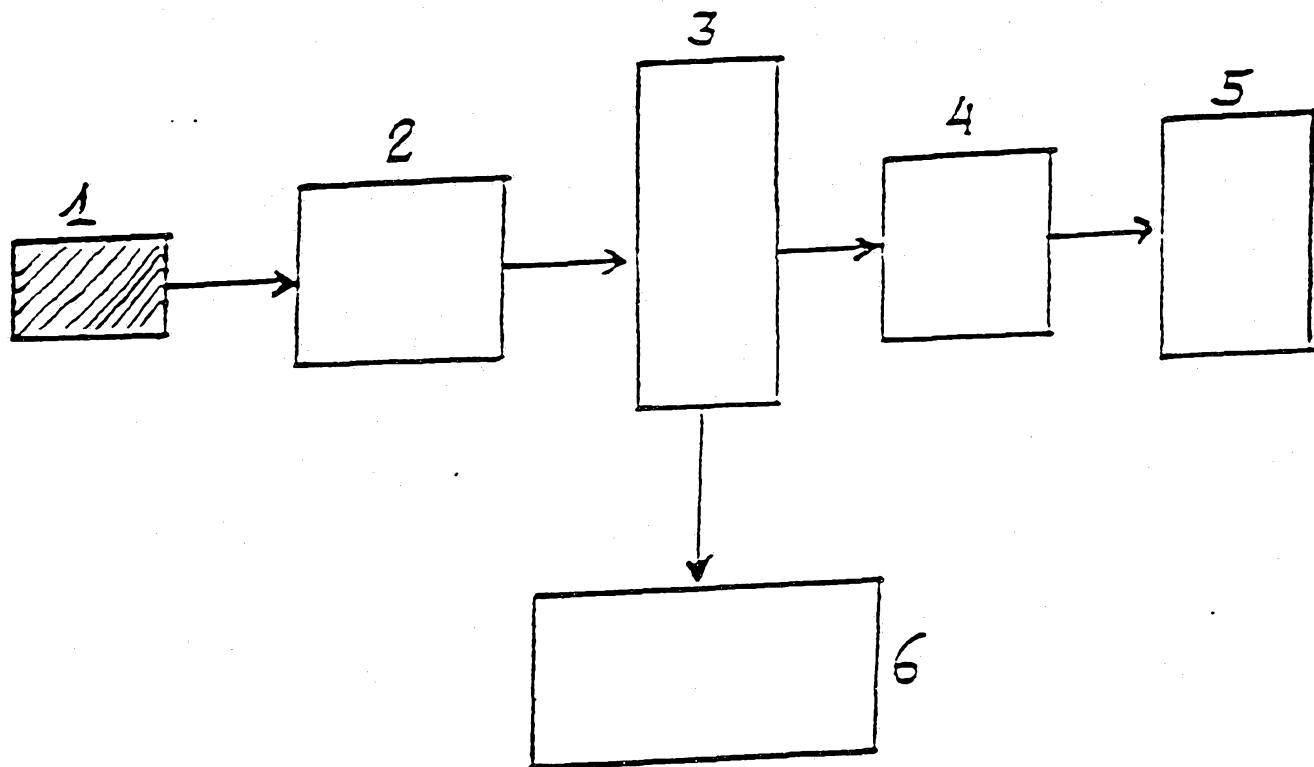
Clinical thermometer with digital and spoken display.

The device comprises an input coming from a conditioning stage of signals given by a sensor, the latter consists of a negative temperature coefficient (NTC) resistor devised to be placed in contact with an area of the human body, a signal transducer consisting a resistance-capacity load network, a microcontroller devised to receive information from the prior stages without needing an analog/digital conversion and having an output for a voice synthesizer that includes filters for eliminating spurious signals, and an amplifying stage of audible signals in view to the driving of an acoustic transducer, as a speaker, and a digital display of the measured temperature.

The device also comprises the association in a unique integrated circuit of the stage conditioning the signals coming from the probe, the microcontroller and the stage conditioning the low frequency signals applied to the speaker, said integrated circuit including a voice synthesizer, a measuring circuit and a microcontroller sending out the appropriate signals to the ideal modules formed by the circuit.

Applicable to the visual and sound displaying of the human body temperature.





29465/92

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 92/00070

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.⁵ G01K13/00
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)

Int. Cl.⁵ G01K

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR,A,2 644 615 (S.E.I.A.) 21 September 1990 see page 3, line 1 - page 4, line 16 see page 7, line 23 - page 7, line 26 -----	1,3,4
X	US,A,4 428 685 (LEMELSON) 31 January 1984 see the whole document -----	1,3
A	DE,A,3 601 675 (OMRON TATEISI ELECTRONICS) 24 July 1986 see page 7, line 3 - page 7, line 29 -----	2
	-/--	

☐ 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 document 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

12 January 1993 (12.01.93)

Date of mailing of the international search report

29 January 1993 (29.01.93)

Name and mailing address of the ISA/

European Patent Office

Facsimile No.

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 92/00070

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 9, No. 236 (P-390)(1959) 21 September 1985 & JP,A,60 91 229 (SUWA SEIKOSHA K.K.) 22 May 1985 see abstract -----	2
A	PATENT ABSTRACTS OF JAPAN vol. 9, No. 54 (P-340) 8 March 1985 & JP,A,59 192 926 (MATSUSHITA DENKO K.K.) 1st November 1984 see abstract -----	2
A	PATENT ABSTRACT OF JAPAN vol. 8, No. 175 (P-294) 11 August 1984 & JP,A,59 068 632 (RHYTHM TOKEI KOGYO K.K.) 18 April 1984 see abstract -----	1

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

**ES 9200070
SA 66744**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12/01/93

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A-2644615	21-09-90	None	
US-A-4428685	31-01-84	US-A- 4437241	20-03-84
		US-A- 4933852	12-06-90
DE-A-3601675	24-07-86	JP-A- 61167827	29-07-86
		US-A- 4771393	13-09-88

INFORME DE BUSQUEDA INTERNACIONAL

Solicitud Internacional N°

PCT/ES 92/00070

I. CLASIFICACION DE LA INVENCIÓN (caso de ser aplicables varios símbolos de clasificación, indicarlos todos) ⁶		
Según la clasificación internacional de patentes (CIP) o según la clasificación nacional y la CIP		
CIP. 5 G01K13/00		
II. SECTORES COMPRENDIDOS POR LA BUSQUEDA		
Documentación mínima consultada ⁷		
Sistema de clasificación	Símbolos de clasificación	
CIP. 5	G01K	
Otra documentación consultada además de la documentación mínima en la medida en que tales documentos forman parte de los sectores comprendidos por la búsqueda ⁸		
III. DOCUMENTOS CONSIDERADOS PERTINENTES ⁹		
Categoría [*]	Identificación de los documentos citados, ¹¹ con indicación, en caso necesario, de los pasajes pertinentes ¹²	N° de las reivindicaciones a las que se refieren ¹³
X	FR,A,2 644 615 (S.E.I.A.) 21 Septiembre 1990 ver página 3, línea 1 - página 4, línea 16 ver página 7, línea 23 - página 7, línea 26	1,3,4
X	US,A,4 428 685 (LEMELSON) 31 Enero 1984 ver el documento completo	1,3
A	DE,A,3 601 675 (OMRON TATEISI ELECTRONICS) 24 Julio 1986 ver página 7, línea 3 - página 7, línea 29	2
-/--		
[*] Categorías especiales de documentos citados: ¹⁰ "A" documento que define el estado general de la técnica, no considerado como particularmente pertinente "E" documento anterior, publicado ya sea en la fecha de presentación internacional o con posterioridad a la misma "L" documento que pueda plantear dudas sobre una reivindicación de prioridad o que se cita para determinar la fecha de publicación de otra cita o por una razón especial (como la indicada) "O" documento que se refiere a una divulgación oral, a un ejemplo, a una exposición o a cualquier otro tipo de medio "P" documento publicado antes de la fecha de presentación internacional, pero con posterioridad a la fecha de prioridad reivindicada "T" documento ulterior publicado con posterioridad a la fecha de prioridad y que no pertenece al estado de la técnica pertinente pero que se cita para comprender el principio o la teoría que constituye la base de la invención "X" documento particularmente pertinente: la invención reivindicada no puede considerarse como nueva ni que implique una actividad inventiva "Y" documento particularmente pertinente: la invención reivindicada no puede considerarse que implique una actividad inventiva cuando el documento se asocia a otro u otros documentos de la misma naturaleza, cuya combinación resulta evidente para un experto en la materia "A" documento que forma parte de la misma familia de patentes		
IV. CERTIFICACION		
Fecha en la que se ha concluido efectivamente la búsqueda internacional	Fecha de expedición del presente informe de búsqueda internacional	
12 ENERO 1993	29.01.93	
Administración encargada de la búsqueda internacional	Firma del funcionario autorizado	
OFICINA EUROPEA DE PATENTES	RAMBOER P.	

EPO FORM (P043)

III. DOCUMENTOS CONSIDERADOS PERTINENTES (CONTINUACION DE LOS DATOS INDICADOS EN LA SEGUNDA HOJA)		
Categoría *	Identificación de los documentos citados, con indicación, en caso necesario, de los pasajes pertinentes	N° de las reivindicaciones a las que se refieren
A	PATENT ABSTRACTS OF JAPAN vol. 9, no. 236 (P-390)(1959) 21 Septiembre 1985 & JP,A,60 91 229 (SUWA SEIKOSHA K.K.) 22 Mayo 1985 ver resumen ---	2
A	PATENT ABSTRACTS OF JAPAN vol. 9, no. 54 (P-340) 2 Marzo 1985 & JP,A,59 192 926 (MATSUSHITA DENKO K.K.) 1 Noviembre 1984 ver resumen ---	1
A	PATENT ABSTRACTS OF JAPAN vol. 8, no. 175 (P-294) 11 Agosto 1984 & JP,A,59 068 632 (RHYTHM TOKEI KOGYO K.K.) 18 Abril 1984 ver resumen -----	1

**ANEXO AL INFORME DE BÚSQUEDA INTERNACIONAL
CORRESPONDIENTE A LA SOLICITUD INTERNACIONAL Nº ES 9200070
SA 66744**

El presente anexo indica los miembros de la familia de patentes correspondientes a los documentos de patentes citados en el informe de búsqueda internacional arriba mencionado.
Dichos miembros están contenidos en el archivo informática de la Oficina Europea de Patentes con fecha
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12/01/93

Documento de patente citado en el informe de búsqueda	Fecha de publicación	Miembro(s) de la familia de patentes	Fecha de publicación
FR-A-2644615	21-09-90	None	
US-A-4428685	31-01-84	US-A- 4437241 US-A- 4933852	20-03-84 12-06-90
DE-A-3601675	24-07-86	JP-A- 61167827 US-A- 4771393	29-07-86 13-09-88