



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁵ : G08B 17/10, G04B 47/00	A1	(11) International Publication Number: WO 92/10820 (43) International Publication Date: 25 June 1992 (25.06.92)
(21) International Application Number: PCT/NO91/00153 (22) International Filing Date: 5 December 1991 (05.12.91) (30) Priority data: 905316 7 December 1990 (07.12.90) NO (71) Applicant (for all designated States except US): NORDIC TECHNOLOGY A.S. [NO/NO]; P.O. Box 101, N-1361 Billingstadsletta (NO). (72) Inventor; and (75) Inventor/Applicant (for US only) : SØMBORG, Tom [NO/NO]; Tverråsen 5, N-1315 Nesøya (NO). (74) Agent: TANDBERGS PATENTKONTOR AS; Postboks 7085 H, N-0306 Oslo (NO).	(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CI (OAPI patent), CM (OAPI patent), DE, DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), GN (OAPI patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC (European patent), MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, PL, RO, SD, SE, SE (European patent), SN (OAPI patent), SU ⁺ , TD (OAPI patent), TG (OAPI patent), US. Published <i>With international search report.</i>	
(54) Title: PORTABLE SMOKE ALARM		
(57) Abstract <p>Portable smoke alarm device comprising a smoke sensor and a battery powered alarm clock, the alarm device comprising a main unit to which a sensor unit may be releasably secured, the sensor unit thereby comprising a smoke detector, a signal transmitter for wireless transmission of signals to the main unit when detecting smoke, the sensor unit being designed for easy detachment near the ceiling of a room such as to a curtain, the main unit comprising an alarm clock, an alarm transmitter or buzzer, a receiver for the receipt of signals from the sensor unit and a battery powering the alarm clock and the buzzer, the main unit furthermore comprising a sensor or switch responsive to whether or not the main unit rests on a surface and a further sensor or switch or switch responsive to whether or not the sensor unit is secured to the main unit, the alarm clock buzzer thereby being activated if the main unit is lifted from the surface without the sensor unit being secured to it.</p>		

+ DESIGNATIONS OF "SU"

Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	ES	Spain	MG	Madagascar
AU	Australia	FI	Finland	ML	Mali
BB	Barbados	FR	France	MN	Mongolia
BE	Belgium	GA	Gabon	MR	Mauritania
BF	Burkina Faso	GB	United Kingdom	MW	Malawi
BG	Bulgaria	GN	Guinea	NL	Netherlands
BJ	Benin	GR	Greece	NO	Norway
BR	Brazil	HU	Hungary	PL	Poland
CA	Canada	IT	Italy	RO	Romania
CF	Central African Republic	JP	Japan	SD	Sudan
CG	Congo	KP	Democratic People's Republic of Korea	SE	Sweden
CH	Switzerland	KR	Republic of Korea	SN	Senegal
CI	Côte d'Ivoire	LI	Liechtenstein	SU ⁺	Soviet Union
CM	Cameroon	LK	Sri Lanka	TD	Chad
CS	Czechoslovakia	LU	Luxembourg	TC	Togo
DE	Germany	MC	Monaco	US	United States of America
DK	Denmark				

Portable smoke alarm

5 The present invention is related to a portable smoke alarm according to the preamble of the claims.

 Portable smoke alarms, especially indented for use when travelling, are commercially available in an number of different designs. One of the problems connected with such smoke alarms,
10 however, is that travelling persons often leave the alarm behind them when leaving a place. The alarm as such is part of a number of subjects to be packed before leaving, often in a hurry.

 Another problem with such portable alarms, an more serious, is that they usually are placed on a bed side table or
15 such, approximately at the same elevation as the user's head. The smoke alarm therefore does not detect smoke where it first is collected in the room, namely near the ceiling. A danger therefore exists that the alarm is activated too late as the person already may be unconscious as the area around the user may
20 have had smoke for a period of time.

 For portable smoke alarms it is essential, as is also for stationary ones, that the battery continuously is checked out and possibly replaced. Known portable smoke alarms do have no build in incentive to control the battery each time the alarm is
25 taken into use.

 The above mentioned disadvantages in connection with known portable smoke alarms limit their reliability which may be one reason why they are not seen more commonly in use.

 It therefore is an object for the present invention to
30 provide a portable smoke alarm without the above mentioned disadvantages, which ensures that the sensor registers smoke where the smoke first will be collected, namely near the ceiling, which furthermore ensures that the battery continuously is controlled and possibly replaced and above all which ensures that
35 the user does not forget the smoke alarm when leaving the place.

 These objects are achieved with the portable smoke alarm according to the present invention as described by the features stated of the claims.

 The portable smoke alarm according to the present

invention comprises one main unit and one sensor unit. The two units are arranged separately during use, however connected to each other to one unit when not in use. The main unit comprises a battery powered alarm clock and suitably also is designed to be used as a flash light. It furthermore comprises a receiver for wireless transmission of signals from the sensor unit. The main unit further comprises an alarm unit connected with the receiver which, when receiving signals from the receiver unit, activates an alarm which may be the buzzer of the alarm clock.

10 The flash light which is build into the main unit, the alarm clock and the receiver unit are all connected with the battery in the main unit which the user will ensure to be intact to be able to use the alarm clock.

The sensor unit comprises a smoke sensor, a battery and 15 a transmitter, preferably for transmitting infrared beams to the main unit when detecting smoke. Preferably an optical sensor is used. The sensor unit may further comprise a buzzer to be activated shortly when the sensor unit is removed from the main unit in case the battery is still intact.

20 The sensor unit is provided with a clamp, a hook, lock or such, thereby making it easy to secure the unit as close to the sealing as possible, such as on curtains or other places.

The sensor unit is to be secured to the main unit after use, by snapping, clamping, by means of a magnet or such. When 25 the sensor unit is removed from the main unit, the buzzer is activated a short moment to indicate that the battery in the sensor unit is intact. In this way it is ensured that the user, before use of the alarm, has controlled that the battery is intact and he may possibly replace the battery with a new battery 30 if the buzzer is not activated.

It further is of importance to ensure that the user is leaving the place without both the main unit and the sensor unit. Therefore the main unit is such designed that the buzzer is activated in case the main unit is lifted from a table or such 35 without having the sensor unit secured to it. This may be achieved for example by arranging in the main unit a sensor or micro switch registration that the main unit is resting on a surface and a further sensor or micro switch registration whether or not the sensor unit is secured to the main unit.

When lifting the main unit without the sensor unit from a table or such, the buzzer in the main unit is activated until the sensor unit is secured to the main unit or the main unit is placed on a surface.

5

10

15

20

25

30

35

P a t e n t C l a i m s

5 1. Portable smoke alarm device comprising a smoke
sensor and a battery powered alarm clock, CHARACTERIZED BY the
alarm device comprising a main unit to which a sensor unit may
be releasably secured, the sensor unit thereby comprising a smoke
10 signals to the main unit when detecting smoke, the sensor unit
being designed for easy detachment near the sealing of a room
such as to a curtain, the main unit comprising an alarm clock,
an alarm transmitter or buzzer, a receiver for the receipt of
signals from the sensor unit and a battery powering the alarm
15 clock and the buzzer, the main unit furthermore comprising a
sensor or switch responsive to whether or not the main unit rests
on a surface and a further sensor or switch responsive to whether
or not the sensor unit is secured to the main unit, the alarm
clock buzzer thereby being activated if the main unit is lifted
20 from the surface without the sensor unit being secured to it.

 2. Smoke alarm device according to claim 1, CHARAC-
TERIZED IN the sensor unit being releasably connected with the
main unit by means of clamping connections, magnets or such.

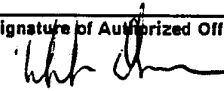
 3. Smoke alarm device according to claims 1-2, CHARAC-
25 TERIZED IN the sensor unit being releasably connectable to
subjects such as curtains, curtain rods or such by means of for
example a lock, a hook, clamp, magnet or such arranged on the
sensor unit.

 4. Smoke alarm device according to claims 1-3, CHARAC-
30 TERIZED IN a buzzer being arranged in the sensor unit and being
activated for a short period of time when the sensor unit is
removed from the main unit, thereby to signal that the battery
still in intact.

 5. Smoke alarm device according to claims 1-4, CHARAC-
35 TERIZED IN the main unit also comprising a flash light powered
by the main unit battery.

INTERNATIONAL SEARCH REPORT

International Application No PCT/NO 91/00153

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶				
According to International Patent Classification (IPC) or to both National Classification and IPC				
IPC5: G 08 B 17/10, G 04 B 47/00				
II. FIELDS SEARCHED				
Minimum Documentation Searched ⁷				
Classification System	Classification Symbols			
IPC5	G 08 B, G 04 B			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched ⁸				
SE,DK,FI,NO classes as above				
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹				
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³		
A	US, A, 4611200 (FRED W. STILWELL) 9 September 1986, see column 2, line 54 - column 3, line 45; abstract --	1-5		
A	US, A, 4480250 (CHARLES D. MCNEELY) 30 October 1984, see abstract --	1-5		
A	US, A, 4369435 (YASABURO ADACHI ET AL) 18 January 1983, see column 3, line 36 - line 64; abstract --	1-5		
A	US, A, 4949077 (DAVID G. MBUTHIA) 14 August 1990, see column 2, line 19 - line 26 -- -----	5		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; border: none;"> <p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; vertical-align: top; border: none;"> <p>"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</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&" document member of the same patent family</p>
<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&" document member of the same patent family</p>			
IV. CERTIFICATION				
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report			
20th March 1992	1992 -03- 23			
International Searching Authority	Signature of Authorized Officer			
SWEDISH PATENT OFFICE	 STEFAN SVAHN			

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/NO 91/00153**

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 Swedish Patent Office EDP file on 28/02/92. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4611200	86-09-09	NONE	
US-A- 4480250	84-10-30	NONE	
US-A- 4369435	83-01-18	AT-B- 388060	89-04-25
		AU-B- 533234	83-11-10
		AU-D- 6060680	81-01-29
		CH-A-B- 659334	87-01-15
		DE-A- 3028395	81-02-12
		FR-A-B- 2462749	81-02-13
		GB-A-B- 2055236	81-02-25
		JP-A- 56021294	81-02-27
		JP-B- 59005955	84-02-08
US-A- 4949077	90-08-14	GB-A- 2236607	91-04-10
		JP-A- 3130899	91-06-04