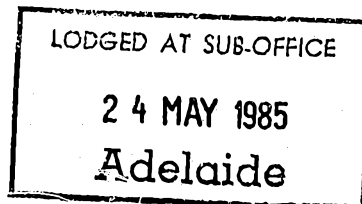
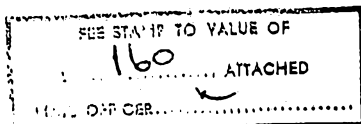


592531

AUS

PATENT OFFICE

PATENT OFFICE



APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED 8.11.89

COMMONWEALTH OF AUSTRALIA  
Patents Act 1952-1966

CONVENTION APPLICATION FOR A PATENT

INSTRUCTIONS

Full name(s) of  
applicant(s).

X/We DEBEX (PROPRIETARY) LIMITED

Address(es) of  
applicant(s).

of 45 Main Street, Johannesburg, Transvaal, South  
Africa

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

"GUILT DETECTION"

which is described in the accompanying complete specification. This application is a Convention  
application and is based on the following application or applications for a patent or patents or  
similar protection made in the following country or countries.

in.....South..Africa..... on...28th..May.....19.84..... No....84/4033.....

in..... on.....19..... No.....

in..... on.....19..... No.....

My/Our address for service is care of R. K. MADDERN and ASSOCIATES, Patent Attorneys.  
345 King William Street, Adelaide, South Australia 5000.

Dated this 24th day of May, 1985

DEBEX (PROPRIETARY) LIMITED,

By its Patent Attorneys,

R. K. MADDERN & ASSOCIATES.

R. S. CATT.

To: The Commissioner of Patents  
Commonwealth of Australia.

APPLICATION TO BE IN PERSONAL NAMES UNLESS BY BODIES  
INCORPORATED BY LAW.

COMMONWEALTH OF AUSTRALIA  
PATENTS ACT 1952-1973  
DECLARATION IN SUPPORT OF CONVENTION OR  
NON-CONVENTION APPLICATION FOR A PATENT  
OR PATENT OF ADDITION

Insert title of invention.

In support of the Application made for a ~~patent~~  
entitled: "GUILT DETECTION" ~~patent of addition~~ for an invention

Insert full name(s) and address(es)  
of declarant(s) being the appli-  
cant(s) or person(s) authorized to  
sign on behalf of an applicant  
company.

I DENNIS EDWARD HAYWARD of 45 Main Street, Johannesburg,  
We Transvaal, South Africa

Cross out whichever of paragraphs  
1(a) or 1(b) does not apply  
1(a) relates to application made  
by individual(s)  
1(b) relates to application made  
by company; insert name of  
applicant company.

do solemnly and sincerely declare as follows :-

1. (a) ~~I am the applicant..... for the patent~~  
~~We are~~ ~~patent of addition~~  
or (b) I am authorized by DEBEX (PROPRIETARY) LIMITED

Cross out whichever of paragraphs  
2(a) or 2(b) does not apply  
2(a) relates to application made  
by inventor(s)  
2(b) relates to application made  
by company(s) or person(s) who  
are not inventor(s); insert full  
name(s) and address(es) of inven-  
tors.

the applicant..... for the ~~patent~~  
~~patent of addition~~ to make this declaration on ~~its~~ behalf.

2. (a) ~~I am~~ ~~the actual inventor..... of the invention~~  
~~We are~~  
or (b) 1) PAOLO SIMONUTTI of 1 Tony Street, Harmelia, 1406, Transvaal,  
SOUTH AFRICA  
2) JOHN OLIVER SPEEDY of 11 Rietbok Road, Robinhills, Randburg,  
Transvaal, South Africa

State manner in which applicant(s)  
derive title from inventor(s)

is the actual inventor(s)..... of the invention and the facts upon which the applicant.....  
are  
is entitled to make the application are as follows :- DE BEERS INDUSTRIAL DIAMOND  
are DIVISION (PTY) LTD. acquired the rights to the invention by virtue of the  
contracts of employment of the inventors. They then assigned  
their rights to Debex (Proprietary) Limited on 22nd April, 1985,  
including the right to claim convention priority.

Cross out paragraphs 3 and 4  
for non-convention applications.  
For convention applications,  
insert basic country(s) followed  
by date(s) and basic applicant(s).

3. The basic application..... as defined by Section 141 of the Act ~~was~~ made  
in SOUTH AFRICA on the 28/5/1984 ~~were~~  
by DE BEERS INDUSTRIAL DIAMOND DIVISION (PTY) LTD  
by.....  
in..... on the.....  
by.....  
in..... on the.....  
by.....

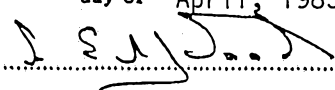
4. The basic application..... referred to in paragraph 3 of this Declaration ~~was~~  
the first application..... made in a Convention country in respect of the invention the subject  
of the application. ~~were~~

Insert place and date of signature.

Declared at Johannesburg this 22 day of April, 1985

Signature of declarant(s) (no  
attestation required)

Note: Initial all alterations.



---

**(12) PATENT ABRIDGMENT (11) Document No. AU-B-43024/85**  
**(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 592531**

---

(54) Title  
**GUILT DETECTION**

International Patent Classification(s)  
(51)<sup>4</sup> **A61B 005/02**

(21) Application No. : **43024/85** (22) Application Date : **24.05.85**

(30) Priority Data

(31) Number	(32) Date	(33) Country
<b>84/4033</b>	<b>28.05.84</b>	<b>ZA SOUTH AFRICA</b>

(43) Publication Date : **05.12.85**

(44) Publication Date of Accepted Application : **18.01.90**

(71) Applicant(s)  
**DEBEX (PROPRIETARY) LIMITED**

(72) Inventor(s)  
**PAOLO SIMONUTTI; JOHN OLIVER SPEEDY**

(74) Attorney or Agent  
**R.K. MADDERN & ASSOCIATES**

(56) Prior Art Documents  
**AU 80704/82 A61B 5/02**  
**GB 1224904**  
**GB 13070943**

(57) Claim

1.

Apparatus for use in combatting theft from a premises, the apparatus including a pulse rate detector which comprises detector plates to be contacted by the palms of persons leaving the premises and means responsive to the pulses detected by the plates to compute an actual pulse rate reading, means for comparing the actual pulse rate with a stored average pulse rate computed from a history of pulse rate measurements conducted in respect of that person or, in cases where there is no stored average pulse rate, with a preselected pulse rate, and means for producing a discernable signal at least when the actual pulse rate exceeds the average pulse rate or predetermined pulse rate, as the case may be.

592531

Form 10

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-62

# COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE:

Application Number: 43024/85.  
Lodged:

Class

Int. Class

Complete Specification Lodged:

Accepted:

Published:

Priority:

Related Art:

Name of Applicant:

TO BE COMPLETED BY APPLICANT  
DEBEX (PROPRIETARY) LIMITED

Address of Applicant: 45 Main Street, Johannesburg, Transvaal, South Africa

Actual Inventor/s:

PAOLO SIMONUTTI and JOHN OLIVER SPEEDY

Address for Service: c/- R. K. MADDERN & ASSOCIATES, 345 King William Street,  
Adelaide, State of South Australia, Commonwealth of  
Australia

Complete Specification for the invention entitled:

"GUILT DETECTION"

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

BACKGROUND TO THE INVENTION

THIS invention relates to the detection of a guilty state of mind.

Theft of goods by employees is a problem faced by a number of employers. It is therefore common for <sup>employees</sup>~~employers~~ to be searched or interrogated as they leave their work premises each evening. Where there are many employees, it is impractical to subject all of them to search or interrogation, and usually only randomly selected employees are so subjected. Despite the deterrent of a possible search, thefts continue.

It is known that a guilty state of mind will generally increase the level of personal stress and that a high level of stress can be evidenced by, inter alia, an elevated pulse rate.

The present invention seeks to provide a method and means whereby this phenomenon can be used to detect persons who have a guilty state of mind.



### SUMMARY OF THE INVENTION

5 The invention provides apparatus for use in combatting theft from a premises, the apparatus including a pulse rate detector which comprises detector plates to be contacted by the palms of persons leaving the premises and means responsive to the pulses detected by the plates to compute an actual pulse rate reading, means for comparing the actual pulse rate with a stored average pulse rate computed from a history of pulse rate measurements conducted in respect of that person or, in cases where there is no stored average pulse rate, with a preselected pulse rate, and means for producing a discernable signal at least when the actual pulse rate exceeds the average pulse rate of preselected pulse rate, as the case may be.

10  
15 Preferably, a person's actual pulse rate is computed as an average on the basis of a plurality of pulse-to-pulse time lapses, the time lapses used in the computation being those which do not differ from one another by more than a predetermined amount.

### BRIEF DESCRIPTION OF THE DRAWING

The sole figure is a schematic representation of apparatus according to the invention.

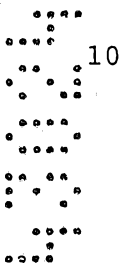


### DESCRIPTION OF AN EMBODIMENT

The illustrated apparatus is intended for installation at an exit check- point from working premises to give an indication to an operator manning the apparatus of persons whose pulse rate is abnormal and who may well be guilty of unlawful behaviour, such as theft from the premises.

5

Referring to the Figure, the numerals 10 represent palm plates of conventional type on which each person to be tested places his palms for detection of his pulse. At the same time, the operator keys into an input keypad 12 the person's reference number, such as an employee reference number obtained from his employee reference card. The keypad includes a visual display 16 on which is displayed the number keyed in to enable the operator to check the correctness of his entry.

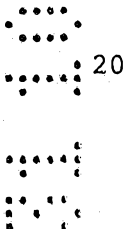


Once the operator is satisfied that the entry is correct, he manipulates the keypad to feed the number to a computer 18 which includes a RAM data bank. The data bank stores average pulse rates for a great number of persons which have been computed by the computer from previous tests conducted on those persons.

15



In order to obtain a reliable actual pulse rate measurement, it is not sufficient merely to measure the time lapse between one pulse and the next, since it is a fact that this time lapse does not always remain constant. The computer therefore computes the actual pulse rate as being the average of four such time lapses which differ from one another by an



amount not greater than a predetermined amount. In other words, it may be necessary for more than four pulse-to-pulse time lapses to be analysed by the computer in order for it to compute an average of four time lapses which are sufficiently close to one another.

- 5 The computer accesses the data bank and compares the past average pulse rate with that actually computed in the present test. If the actual pulse rate exceeds the accessed average by more than 20 beats per minute, (BPM) but less than 45 BPM, the computer generates a signal which energises a visible light 20 to indicate to the operator that an abnormal pulse rate has been detected and that further investigation is advisable.
- 10 If the comparison reveals a difference of more than 45 BPM, a light 22 is energised to indicate to the operator that an extremely abnormal pulse has been detected, and that a more stringent search or interrogation than would normally be conducted is necessary.
- 15 If the comparison indicates a difference of less than 20 BPM, the computer energises another light 24 which indicates to the operator that further investigation is probably not necessary.

If the comparison reveals a difference greater than 20 BPM, the stored average is not updated, while if it is less than 20 BPM, it is. In this way, the average is not influenced by a single abnormal measurement.

The apparatus may also include means 26 which serve automatically to open one of two or three doors leading to an exit, or to one or more search/interrogation rooms through which the person may leave the check-point depending on which light has been energised.

- 25 The apparatus also enables the operator to over-ride the computer. If, for instance, the operator has reason to suspect any particular person, he pre-programmes the computer to energise the light 20 or 22 as soon as that person's number is keyed in, irrespective of what the computer's comparison may indicate. In this way, persons who could possibly exhibit



a pulse rate within normal limits and would complain if they were subjected to further investigation although the lights 24 were showing, would be unaware of the operator's activities.

In making this invention, the inventors considered various ways in which 5 persons could attempt to foil the test. For instance, persons guilty of unlawful behaviour and aware that they will probably be subjected to intensive interrogation or search could take pulse-rate depressing drugs. The computer could easily be programmed to indicate to the operator (and to open one of the search doors) if an abnormally low pulse rate is 10 revealed, i.e. the existence of an abnormally low pulse rate may also result in search or interrogation.

It will happen that a number of persons, such as visitors, about whom no past pulse rate history has been accumulated will also be required to pass through the check-point. In this case, the operator keys into the 15 computer a special visitor's code number and the computer will then compare the actual pulse rate with a standard preselected pulse rate of 80 BPM, which the inventors have found is an average pulse rate for tests conducted on a great number of persons. The indications given to the operator will be the same as described previously if the actual pulse 20 rate differs from the set rate of 80 BPM by less than 20 BPM, more than 20 BPM but less than 45 BPM, or more than 45 BPM.

The apparatus may also include a printer 30 which provides the operator with a hard-copy print-out of the results of each test where abnormal pulse rates have been measured.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1.

Apparatus for use in combatting theft from a premises, the apparatus including a pulse rate detector which comprises detector plates to be contacted by the palms of persons leaving the premises and means responsive to the pulses detected by the plates to compute an actual pulse rate reading, means for comparing the actual pulse rate with a stored average pulse rate computed from a history of pulse rate measurements conducted in respect of that person or, in cases where there is no stored average pulse rate, with a preselected pulse rate, and means for producing a discernable signal at least when the actual pulse rate exceeds the average pulse rate or predetermined pulse rate, as the case may be.

2.

The apparatus of Claim 1, in which the signal producing means is arranged to produce a first discernable signal whenever the actual pulse rate is between 20 beats per minute and 45 beats per minute greater than the average pulse rate or preselected pulse rate, as the case may be.

3.

The apparatus of Claim 2, in which the signal producing means is arranged to produce a different discernable signal whenever the actual pulse rate exceeds the average pulse rate or preselected pulse rate, as the case may be, by more than 45 beats per minute.

4.

The apparatus of any one of Claims 1 to 3, in which the means for computing the actual pulse rate is adapted to perform its computation on the basis of a plurality of pulse-to-pulse time lapses, those lapses used in the computation being lapses which do not differ from one another by more than a predetermined amount.

5.

The apparatus of any one of Claims 1 to 4 including means for updating the stored average pulse rate with the actual pulse rate, but only when the actual pulse rate does not exceed the existing stored pulse rate by more than a predetermined amount.

5

6.

Apparatus for use in combatting theft from a premises substantially as herein described with reference to the accompanying drawing.

Dated this 31st day of October, 1989

DEBEX (PROPRIETARY) LIMITED,

By its Patent Attorneys,  
R.K. MADDERN & ASSOCIATES.

RCM

2

43 024/85

