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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(54) Title: TELECOMMUNICATIONS SYSTEMS

(57) Abstract

Details of all anonymous calls (calls in which the caller's CLI is withheld from the called party) are stored for a predetermined time. If a called party reports that an anonymous call was a nuisance call, details thereof (including the CLI) can be accessed by the system operator.

TELECOMMUNICATIONS SYSTEMS

TECHNICAL FIELD

The present invention relates to a
telecommunications system, and in particular to a
telecommunications system in which anonymous and
nuisance calls can be traced.

DESCRIPTION OF THE RELATED ART

In conventional telecommunications networks, if a
subscriber receives a one-off or unexpected nuisance or
malicious call, and the caller withholds their calling
line identifier (CLI), it is not possible to identify
the origin of the call.

Several systems have been proposed in order to
overcome this problem. Even if the caller's CLI is
withheld, it will be stored, and can be accessed at the
exchange the subscriber has a caller return service
provided. However, only the most recently received CLI
is stored, and so the number is overwritten with each
subsequent incoming call and can therefore be quickly
lost.

Alternatively, an anonymous call rejection system
simply rejects any calls made to a subscriber with the
service active when the caller withholds their number.
This creates problems where legitimate callers withhold
their numbers as standard practice, for example in the
case of an ex-directory caller.

Service interception diverts all incoming calls
from a subscriber with the service to an operator.
After the operator has investigated and approved the
nature of the call, it is forwarded to the called
subscriber. The disadvantage is that the service is
not appropriate for occasional nuisance calls.

SUMMARY OF THE INVENTION

The present invention seeks to provide a system
which allows an occasional nuisance caller to be
traced. Specifically, whenever a calling line

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identifier is withheld from the called party, details
of the call are stored, and can be accessed if the
called party subsequently complains that the call was a
nuisance call.

5   It is an object of the present invention to allow
an occasional random nuisance call to be traced back to
the caller.

BRIEF DESCRIPTION OF THE DRAWINGS

10   Figure 1 shows a schematic diagram of a
telecommunications network;
           Figure 2 shows a schematic diagram of an exchange
unit used in the network of Figure 1; and
           Figures 3 and 4 are flowcharts showing steps in
15   the use of a system embodying the present invention.
DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS
           Figure 1 shows a schematic view of a
telecommunications system 1 in which a caller 11 makes
a call to a called party 12 by way of a network 13
20   including a local exchange 14. The called party 12 is
connected to its local exchange 14 in order to connect
to the network. Each caller 11 and called party 12 has
an individual calling line identifier (CLI) associated
with it so that they can be identified, for example for
25   billing purposes. The calling line identifier (CLI)
also enables the call to be correctly routed through
the network 13 between the two parties. Depending on
the type of telephone apparatus used by the called
party, the CLI of the caller may be displayed to the
30   called party before the call is answered, or may be
announced to the called party (on request) after the
call is determined. However, the caller may withhold
his CLI, so that it is neither displayed nor announced
by the called party.
35   A call is usually set up between the caller 11 and
the called party 12 through many nodes of the network,

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the last node being the local exchange 14.

Such a local exchange 14 is shown schematically in
Figure 2, and includes an input line 20 which is
connected to a call routing unit 21. The routing unit

5   21 operates to connect the incoming call to the correct
outgoing line 24, in order to set up the call. The
outgoing line 24 is connected to the called party.

The exchange also includes a calling line
identifier processing unit 22 and an anonymous call

10   trace database 23.

With reference to Figures 2 and 3, each time an
anonymous call (that is, a call in which the calling
party has requested that his CLI should be withheld
from the called party) is received in the local

15   exchange 14, an anonymous call trace (ACT) record is
created for the called party 12 and the anonymous call
data (for example CLI date and time) is stored in the
ACT database 23. As shown in Figure 3, a call is
received, step 32, and then checked (step 33) to

20   confirm that the CLI is to be withheld from the called
party 12. If this is not the case, then the call is
set up immediately (step 34). If the call is to be
anonymous, however, the call details are stored in the
database (step 35). The call is then set up (step 34)

25   as usual. Optionally, the stored records in the
database can be deleted if they are unmarked and over a
predetermined age (step 36). For example, call records
can usefully be kept for 24 hours, or more.

If the called party 12 subsequently reports the

30   receipt of an anonymous nuisance call, then the ACT
call record can be found and marked so that the
complaint is registered. As shown in Figure 4, the
service provider receives a call report (step 42) and
then searches the database using the called party's CLI

35   (step 43). This will enable any anonymous calls to be
traced that have been made to the called party within

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the predetermined time limit. If no anonymous call
records exist (step 44), then the procedure ends.
However, if anonymous call records do exist, then those
records are marked so that they can be retained in the
5   database.

At step 46, the decision regarding further
searching is made. If a further search is required,
for example so that the database can be searched using
the CLI of one or all of the found calling parties
10   (step 47) in order to cross check anonymous call
instances. Any records found are again marked (step
48).

Call data relating to anonymous calls is stored
for a predetermined data retention period, for example
15   24 hours. However, if the record has been marked as
relating to an anonymous nuisance call, then the record
is retained until deleted by an operator command. Call
data for all subsequent anonymous calls to the same
subscriber can also be stored, marked and retained.

20   The system thus stores calling line identifier
data of calls made in which the CLI data is not to be
supplied to the called party, the so-called anonymous
calls.

If a subscriber receives a nuisance call it should
25   be reported directly to the service provide or via the
local authority. Then if the calls continue the
subscriber concerned may request that the ACT data be
made available through appropriate channels if legal
action is to be taken.

30   As described above, when a nuisance call is
reported, the service provider searches for ACT data on
the basis of the called party's identifier so as to
validate the data.

The ACT database is readily searchable, for
35   example, by way of the called party's identifier, or by
way of the calling party's identifier. For example, if

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a nuisance call has been received by one called party the database can be interrogated so as to discover whether the same nuisance caller has called any other users of the network.

5   If a nuisance caller persists in calling a particular subscriber, then call data from previously reported calls may be used to create a conference call between the two subscribers and a recording device, thus providing further evidence of nuisance calls.

10   The advantages of the embodiments of the present invention are as follows:

Random nuisance calls by a single offender are more readily traced to a single source, since details of all anonymous calls are stored;

15   Nuisance callers who may be aware of special subscriber services such as customer originated trace and malicious call trace, and therefore may only make a small number of infrequent calls to a single number, can be traced easily; and

20   No specific subscriber action is required to enable call data to be stored since call data is recorded automatically for those calls in which the CLI is withheld from the called party. Subscriber action is only needed when an anonymous nuisance call is

25   received. That single call can be traced instead of waiting for further nuisance calls.

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CLAIMS

1. A telecommunications system in which a calling party can withhold its calling line identifier from a called party, wherein the system includes storage means for exclusively storing call information relating to all calls connected by the system in which the calling line identifier is withheld.

2. A system as claimed in claim 1, wherein the storage means is searchable by way of a called or calling party's identifier.

3. A system as claimed in claim 1 or 2, wherein the stored call information is held for a predefined amount of time.

4. A system as claimed in claim 1, 2 or 3, wherein the stored call information relating to a particular call in which the calling line identifier has been withheld, is accessible on receipt of a request for information from a user of the network.
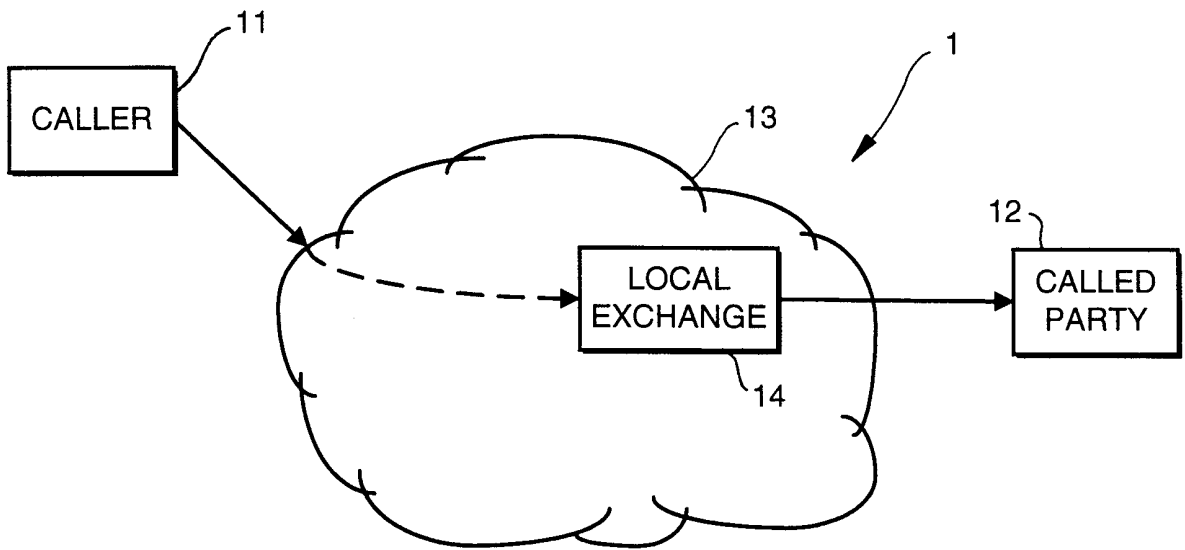
FIG.1
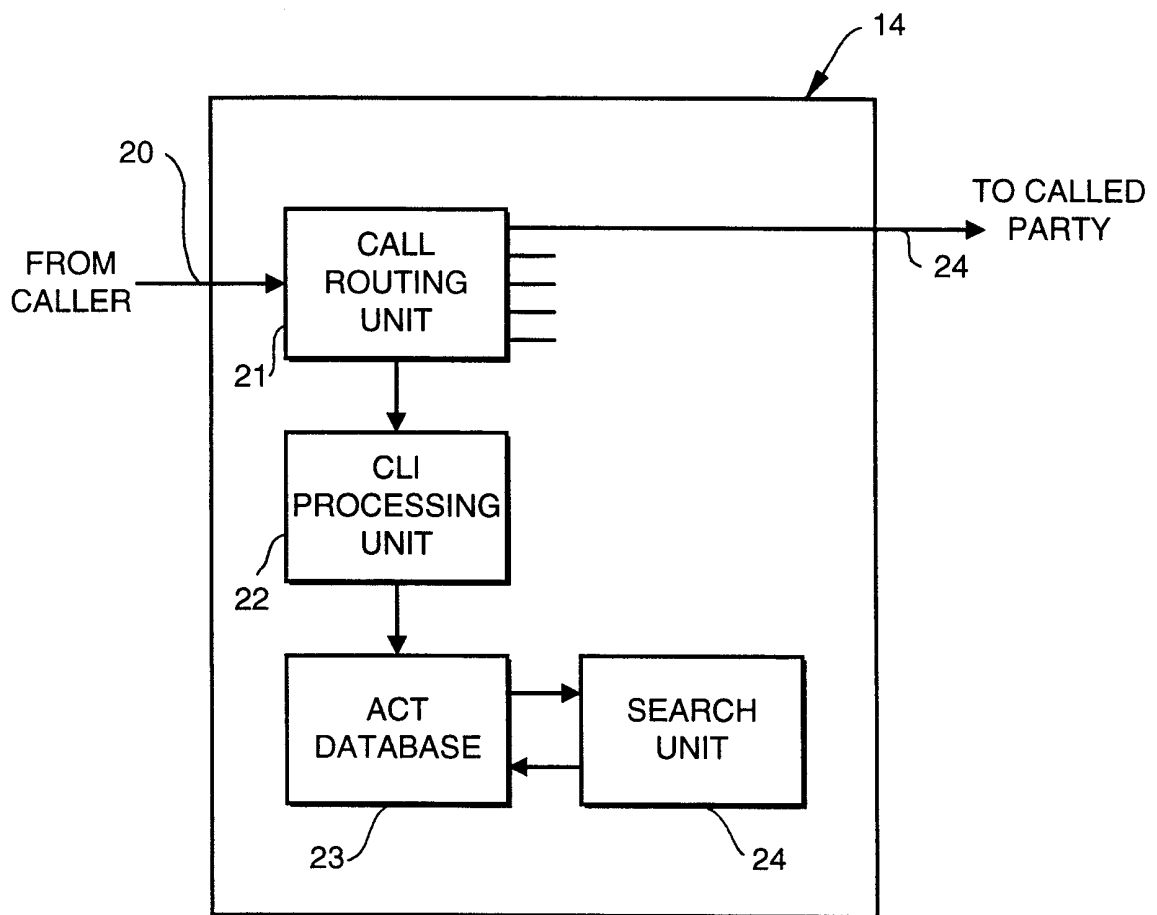
FIG.2
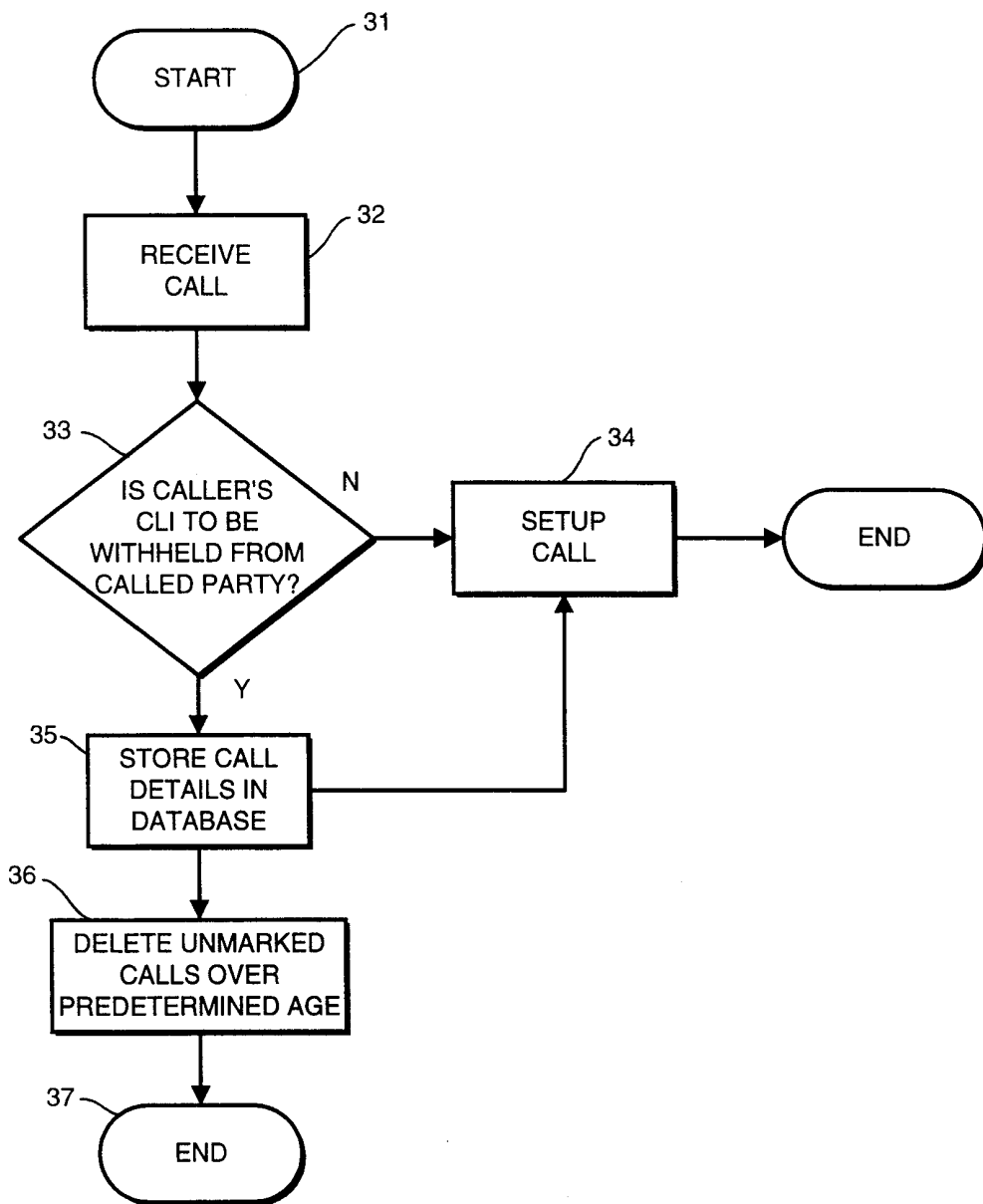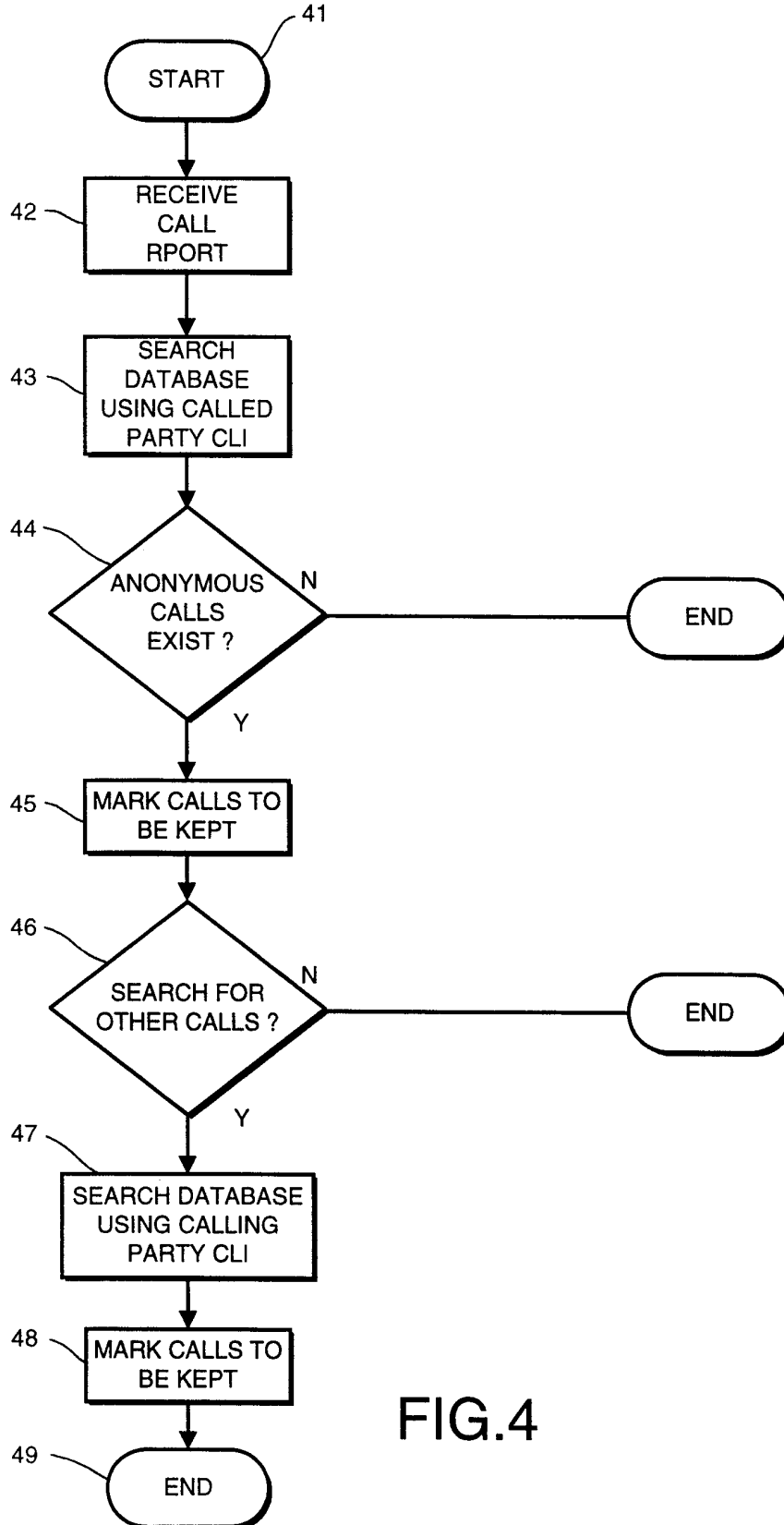
```
                    ┌──────────┐
                    │  START   │──31
                    └──────────┘
                         │
                         ▼
                    ┌──────────┐
                    │ RECEIVE  │──32
                    │  CALL    │
                    └──────────┘
                         │
                         ▼
              33        ╱╲
                ╲      ╱  ╲        N      ┌──────────┐      ┌──────────┐
                 ╲    ╱ IS CALLER'S╲─────▶│  SETUP   │─────▶│   END    │
                  ╲  ╱  CLI TO BE   ╲  34 │  CALL    │      └──────────┘
                     ╲ WITHHELD FROM╱     └──────────┘
                      ╲CALLED PARTY?╱          ▲
                       ╲          ╱            │
                        ╲  ╱  ╲  ╱             │
                         ╲╱    ╲╱              │
                         │ Y                   │
                         ▼                     │
              35   ┌──────────┐                │
                   │STORE CALL│                │
                   │DETAILS IN│────────────────┘
                   │ DATABASE │
                   └──────────┘
                         │
              36         ▼
                   ┌──────────────┐
                   │DELETE UNMARKED│
                   │ CALLS OVER    │
                   │PREDETERMINED AGE│
                   └──────────────┘
                         │
              37         ▼
                    ┌──────────┐
                    │   END    │
                    └──────────┘
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FIG.3

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FIG.4

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6   H04M3/42   H04Q3/72

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)
IPC 6   H04Q   H04M

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 practical, 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	US 5 361 295 A (KIMBALL JOHN ET AL) 1 November 1994 see column 12, line 10 - line 37 see figure 11 ---	1-4
A	US 5 497 414 A (BARTHOLOMEW DALE L) 5 March 1996 see column 3, line 12 - line 43 see column 6, line 60 - column 7, line 27 ---	1-4
A	US 5 274 699 A (RANZ STEPHEN J) 28 December 1993 see the whole document --- -/--	1-4

X	Further documents are listed in the continuation of box C.		X	Patent family members are listed in 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	Date of mailing of the international search report
26 November 1998	04/12/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Megalou, M

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication.where appropriate. of the relevant passages	Relevant to claim No.
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A	US 5 001 710 A (GAWRYS GEORGE W ET AL) 19 March 1991 see abstract -----	2

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Int   tional Application No

PCT/EP 98/04276

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