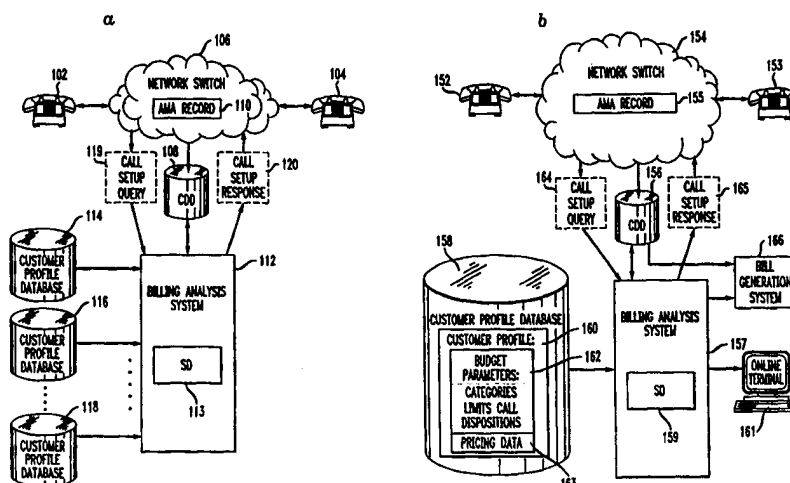




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04M 15/00	A1	(11) International Publication Number: WO 98/42122 (43) International Publication Date: 24 September 1998 (24.09.98)
(21) International Application Number: PCT/US98/02929 (22) International Filing Date: 11 February 1998 (11.02.98) (30) Priority Data: 08/825,547 19 March 1997 (19.03.97) US (71) Applicant: AT & T CORP. [US/US]; 32 Avenue of the Americas, New York, NY 10013-2412 (US). (72) Inventors: JAGADISH, Hosagrahar, V.; 16 Beech Avenue, Berkeley Heights, NJ 07922 (US). MUMICK, Inderpal, S.; 85 Swenson Circle, Berkeley Heights, NJ 07922 (US). (74) Agents: DWORETSKY, Samuel, H. et al.; AT & T Corp., P.O. Box 4110, Middletown, NJ 07748 (US).		(81) Designated States: CA, JP, MX, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>

(54) Title: TELEPHONE BILLING WITH CUSTOMER-DEFINED BUDGETING**(57) Abstract**

A method and system of telephone call processing that provides direct control of telephone usage based on customer established budgets. According to one aspect of the present invention, customer specific information including pricing data and budget parameters for a customer are stored, as is summary information relating to customer telephone usage. A call setup query is received from a network switch. A call setup response is generated based on the budget parameters and the summary information and the call setup response is transmitted to the network switch. In order to generate the stored summary information, a plurality of records are received wherein each record describes a telephone call. A priced call value for each call is determined using the record and the customer specific information. Summary information for the customer is determined using the record, the priced call values and the budget parameters. The summary information is then stored. According to another aspect of the present invention, a network switch receives a telephone call from a caller and transmits a call setup query identifying the caller to a billing analysis system. The network switch receives a call setup response indicating whether summary information of the caller exceeds at least one budgetary limit of the caller and determines whether to complete the call based on the call setup response.

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.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

TELEPHONE BILLING WITH CUSTOMER-DEFINED BUDGETING

Field of the Invention

The present invention relates to the processing of telephone calls, and
5 in particular, to the billing of the costs of such calls.

Background of the Invention

Many telephone service customers desire to control the cost of their
telephone usage. Telephone bills provide information about recent past
10 usage, but do not provide customers with control over current usage. It would
be useful if telephone service customers could directly control their telephone
usage by establishing budgets.

Summary of the Invention

15 The present invention is a method and system of telephone call
processing that provides direct control of telephone usage based on customer
established budgets.

According to one aspect of the present invention, customer specific
information including pricing data and budget parameters for a customer are
20 stored, as is summary information relating to customer telephone usage. A

call setup query is received from a network switch. A call setup response is generated based on the budget parameters and the summary information and the call setup response is transmitted to the network switch.

In order to generate the stored summary information, a plurality of
5 records are received wherein each record describes a telephone call. A priced call value for each call is determined using the record and the customer specific information. Summary information for the customer is determined using the record, the priced call values and the budget parameters. The summary information is then stored.

10 According to another aspect of the present invention, a network switch receives a telephone call from a caller and transmits a call setup query identifying the caller to a billing analysis system. The network switch receives a call setup response indicating whether summary information of the caller exceeds at least one budgetary limit of the caller and determines
15 whether to complete the call based on the call setup response.

Brief Description of the Drawings

The details of the present invention, both as to its structure and operation, can best be understood by referring to the accompanying drawings,
20 in which like reference numbers and designations refer to like elements.

Fig. 1a is a block diagram of one embodiment a telephone call billing system, in which the present invention may be implemented.

Fig. 1b is a block diagram of the telephone call billing system of Fig. 1a, showing a customer profile including summary parameters according to
5 the present invention.

Figs. 2a and 2b are a flow diagram of the operation of a summary billing process according to the present invention.

Fig. 3 is a block diagram of another embodiment a telephone call billing system, in which the present invention may be implemented.

10 Fig. 4 is a block diagram of another embodiment a telephone call billing system, in which the present invention may be implemented.

Detailed Description of the Invention

Referring to Fig. 1a, there is shown a block diagram of a telephone
15 system in accordance with one embodiment of the present invention. There is shown a calling telephone **102**, a called telephone **104**, a telephone network switch **106** and a Call Detail Database (CDD) **108**. An Automatic Message Accounting (AMA) record, represented by a block **110**, is also shown. As indicated by the figure, a billable call may be initiated at telephone **102** and
20 routed through switch **106**, e.g., an AT&T 4ESS switch, to telephone **104**.

The switch generates AMA record 110, which includes the information necessary to rate the call. The AMA record is passed to CDD 108. It should be noted here that there are an abundance of protocols and transmission media that may be used for passing the data from the switch to the CDD. For
5 example, suitable protocols include the well known File Transfer Protocol (FTP) and Transmission Control Protocol/Internet Protocol; and suitable transmission media include twisted shielded pair wires, fiber optic lines, coaxial cable, and wireless links. Moreover, these protocols and media are suitable for use in all data transfers and queries hereinafter described.

10 In any event, once the AMA record has been passed to the CDD, it is available for use in pricing the call. To this end, the AMA record is passed to a billing analysis system 112, which may be a general purpose computer capable of running the software necessary to implement the invention. The billing analysis system applies any customer specific billing parameters to the
15 AMA record to produce a processed AMA record. It then passes both the AMA record and the processed AMA record back to the CDD for storage. A method for passing the data back to the CDD is disclosed in co-pending, commonly assigned, US Patent Application Serial No.: 08/607,983 - entitled "Compression and Buffering of a Stream with Data Extraction Requirements"
20 - which application is incorporated herein by reference.

The billing analysis system performs its functions the instant the switch passes the AMA record to the CDD (i.e. it performs call pricing in real-time). In order to achieve real-time processing of AMA records the invention must overcome two primary obstacles. First, the customer specific data is fragmented across multiple business units, with no cohesive notion of an integrated customer profile. This situation is depicted in Fig. 1a, which shows several customer profile databases 114, 116 and 118. As shown in the figure, the invention overcomes this obstacle through the use of an integrated customer profile database located within the billing analysis system.

Software tools update the integrated customer profile database in response to updates of the individual customer profiles 114, 116 and 118 so that the integrated database always contains current information on all customers.

The volume of customer and telephone call data makes it difficult to store, rate, and query call data in real-time. To surmount this obstacle the invention accumulates summary information as each individual call (AMA) record is received and rated in real-time. It is generally desirable for a telephone network to maintain a customer's current bill. Thus, one type of accumulated summary information may be current bills for each network customer. Nevertheless, it may be useful to accumulate other types of summary information for particular customers. The nature of the

accumulated summary information for a particular customer depends upon the services subscribed to by that customer.

For example, a customer may subscribe to a plan in which calls made during the hours between 5:00pm and 9:00am receive a 10% discount; in
5 which case it is useful to maintain a summary field containing the number of minutes of calls that the customer has made during the discount period.

In any case, the summary information is stored in a Summary Database (SD) 113 that is located within the billing analysis system. Thus, in this embodiment, AMA records and processed AMA records are stored in the
10 CDD, while summary information is stored in the SD. Once summary information has been stored in SD 113, it is available for immediate access. It should be noted that many alternative storage schemes may be employed without departing from the spirit of the invention. For example, in one alternative scheme, AMA records are stored in the CDD, summary
15 information are stored in the SD, and processed AMA records are stored in both the CDD and SD.

One use for real-time access to summary information involves call setup query 119. When a call is initiated, for example, by telephone station 102, and routed to network switch 106, before the call is connected to the
20 destination station, for example, station 104, switch 106 may transmit a call

setup query **119** to billing analysis system **112**. The call setup query includes information identifying the customer that placed the call. Typically the Automatic Number Identification (ANI) is used for this purpose. In an ANI system, the number of the telephone station from which a call is initiated is
5 determined and used to identify the party who initiated the call. The call setup query also includes information identifying the destination of the call and may include other information. In response to receiving query **119**, billing analysis system **112** may access summary information stored in SD **113** and generate a call setup response **120** based on the summary
10 information.

The processing involved in customer-defined budgeting is shown in Fig. 1b, which, as an example, shows the present invention implemented in the telephone billing system of Fig. 1a. The present invention may be similarly implemented in the telephone billing systems shown in Figs. 3 and
15 4.

The processing involved in customer-defined budgeting includes two phases: the call setup phase and the call completion phase. The call completion phase begins once a billable call has occurred. Typically, a billable call occurs once a call has been completed from a calling station to a
20 destination station, for example from calling station **152** to destination station

153. Once a billable call occurs, network switch 154 generates a corresponding AMA record 155. The AMA record includes an indication of the customer that placed the call. Typically the Automatic Number Identification (ANI) is used for this purpose. Each AMA record is passed to
5 CDD 156, making the record available for call pricing. Each AMA record is passed from CDD 156 to billing analysis system 157, which applies the customer specific billing parameters contained in the attached customer profile database, such as database 158. The billing analysis system 157 then generates updates to summary information stored in the summary database
10 (SD) 159 based on the customer profile 160 stored in customer profile database 158. The updates to the summary information are generated in real-time as calls are placed and AMA records generated. Updated summary information is available for access immediately after a summary information update is entered into SD 159. Thus, updated summary information may be
15 accessed whenever desired. For example, a bill may be generated in real-time upon demand of a customer. Summary information stored in SD 159 may also be made available to customers without generating a bill. Snapshot summaries, of the current status of the customer's account, may be generated. In addition, online access to summary information may be provided, such as
20 by online terminal 161.

Customer profile **160** includes budget parameters **162** that define the summary information that is to be generated and the budget information that is to be applied to the summary information for the customer. Customer profile **160** also includes pricing data **163** that is used to price each telephone
5 call. Customers may subscribe to billing services which provide semi-custom budgeting, or fully custom budget information may be provided. The budget parameters may be defined directly by the customer, or the budget parameters may be defined based on a budgetary arrangement requested by the customer.

Typically, budget parameters **162** specify categories for which
10 information is compiled and for which budgetary limits are defined. Budget parameters **162** may specify that summary information be compiled based on a budgetary category and also specify a maximum cost for that category. For example, the budgetary category may be defined as the total cost of calls made each day and the maximum cost is applied to the cost of those calls. In
15 this example, the summary information update generated for each call would include an update to the total cost of calls made that day. Likewise, budgetary categories may be defined, and the corresponding summary information may be compiled, based on the total cost of calls made to each of a given set of numbers, area codes, cities, states, countries, etc., on the time or cost of calls
20 in one or more discount plans, or based on the type of calls made, such as

collect calls, etc. Budget parameters **162** may also specify call dispositions to be performed when corresponding budget limits are exceeded.

The call setup phase occurs once a call from calling station has been routed to network switch **154**, before the call is completed to the destination station. For example, a customer places calls from calling station **152** to destination station **153**. The call is routed to a network switch **154**, which generates a call setup query **164**, beginning the call setup phase. Switch **154** transmits query **164** to billing analysis system **157**. The call setup query includes information identifying the customer that placed the call and information identifying the destination of the call and may include other information.

Upon receiving query **164**, billing analysis system **157** accesses customer profile database **158** and obtains the customer specific information contained in customer profile **160**. In particular, billing analysis system **157** applies pricing data **163** and budget parameters **162** to the information in query **164**. Since the call has not been completed, a priced call value cannot be determined. However, pricing data **163** and budget parameters **162** are used to determine a budgetary category for the call, based on the budget defined for the customer. Billing analysis system **157** accesses summary database **159** and obtains the customer's summary information for the

corresponding budgetary category. Billing analysis system 157 applies the budgetary limit for the budgetary category that is defined by budget parameters 162 to the summary information and determines the disposition of the call. The call disposition may be defined along with the budgetary limits,
5 or the billing analysis system may apply default call dispositions. Billing analysis system 157 generates a call setup response 165 indicating the disposition of the call and transmits response 165 to network switch 154. Upon receiving response 165, network switch 154 handles the call according to the call disposition in response 165.

10 For example, a customer may define a budgetary category of the total cost of calls per day, with a limit on the category of \$20.00. The customer may specify a call disposition for that limit such that no calls are to be allowed once the limit is exceeded. The customer may also specify a limit on the category of \$15.00, with a call disposition such that a warning message is
15 played to the caller before each call is connected, once the limit is exceeded. Each call that is placed causes billing analysis system 157 to access the summary information for the budgetary category and compare the summary information to the defined limits. In this example, the summary information includes the total cost of calls each day. When a new call is placed, the
20 current total cost is compared to the defined limits. If the current total cost is

less than \$15.00, the call setup response includes a call disposition indicating that the call is to be completed normally. If the current total cost is between \$15.00 and \$20.00, the call setup response includes a call disposition indicating that a warning message is to be played, then the call is to be
5 completed normally. If the current total cost is greater than \$20.00, the call setup response includes a call disposition indicating that the call is not to be completed. The call setup response may also include information used to generate informative messages to be played to the call, such as the budgetary categories, limits and current total cost.

10 More complex budget limit definitions, and corresponding call dispositions, are possible. For example, three, four, or more budget limits may be defined, with different messages to be played when each limit is exceeded. Budget limits may be simultaneously active in a plurality of categories, such as total call usage, calls to particular locations, calls made at
15 particular times of day, calls made which fall into particular billing plans, etc. All budget limits may be simultaneously active and each call may be cause comparisons to be made against all active budget limits.

Complex budget definitions may result in complex call dispositions being performed. Dispositions other than rejecting the call and playing a
20 warning message may be defined. For example, calls may be forwarded,

routed to voice mail or otherwise rerouted. In addition, calls may be delayed and automatically connected at a later time, such as when lower rates are in effect, etc. The call dispositions may be defined along with the budget limits and categories, or default call dispositions may be applied.

5 Bills are generated by bill generation system **166** based on the summary information stored in SD **159**, which depends on the budget parameters **162** in the customer profile. Bills may be generated periodically, on a predetermined schedule, whenever the generated summary information reaches a predetermined threshold, or bills may be generated whenever
10 desired. If desired, budgetary information may be added to a bill by using the budget parameters **162**.

Figs. 2a and 2b show, in flowchart form, a procedure that a billing analysis system may use to perform customer-defined budget processing for each call. The call setup phase is shown in Fig. 2a and the call completion
15 phase is shown in Fig. 2b. In the following description of the flowchart, references will be made to the embodiment shown in Fig. 1b.

Referring to Fig. 2a, the process begins with step **202**, in which a call is received at a network switch **154**. In step **204**, network switch **154** generates and transmits a call setup query **164** to a billing analysis system
20 **157**. The call setup query **164** includes information identifying the customer

that placed the call and information identifying the destination of the call and may include other information. In step **206**, billing analysis system **157** applies the customer specific information, including the budget parameters **162** and the pricing data **163**, to the information in the call setup query and
5 determines the budgetary categories affected by the call. In step **208**, billing analysis system **157** accesses the summary database **159** and obtains the summary information for the affected budgetary categories. In step **210**, billing analysis system **157** compares the obtained summary information to the defined budgetary limits. In step **212**, billing analysis system **157**
10 generates a call setup response **165** based on the defined budgetary limits and the defined call dispositions. Billing analysis system **157** then transmits the call setup response **165** to the network switch **154**.

Turning now to Fig. 2b, the process continues with step **214**, in which the network switch **154** receives the call setup response **165** and determines
15 from the call disposition included in the response whether the call should be completed. If response **165** indicates that the call should not be completed, then in step **216**, the network switch plays a reject message, if any is indicated by the call disposition included in the response. For example, a reject message might inform the caller that the call will not be completed because
20 usage in a particular budgetary category has been exceeded. The category

and any other information needed for the message is included in the call setup response. In step **218**, network switch **154** then rejects the call.

If the call disposition included in call setup response **165** indicates that the call should be completed, then in step **220**, network switch **154** plays a
5 warning message, if any is indicated by the call disposition included in response **165**. For example, a warning message might inform the caller that usage is approaching the limit in a particular budgetary category. Again, the category and any other information needed for the message is included in the call setup response. In step **222**, network switch **154** completes the call to the
10 destination station, generates an AMA record **155** and transmits AMA record **155** to the CDD **156**. The AMA record is then passed from CDD **156** to billing analysis system **157**. In step **220**, upon receiving an AMA record, such as **155** from CDD **156**, billing analysis system **157** rates the call. In step **224**, billing analysis system **157** matches the rated call to the customer, so that
15 customer specific parameters can be applied to the call.

Several well known techniques can be used to match the rated call to the customer. One such technique uses Automatic Number Identification (ANI). In an ANI system, the number of the telephone station from which a call is initiated is determined and used to identify the party who initiated the
20 call. Accordingly, in the Fig. 1b embodiment, the number of a telephone,

such as **152** may be determined and passed to the billing analysis system along with the AMA record. The billing analysis system may then cross-reference the number to the customer profile containing the customer specific data to be used for the current call. For example, AMA record **155** is cross-

5 referenced to customer profile **160**, which also relates to that customer. Customer profile **160** contains customer specific pricing data **163** that is used to price the call, as well as budget parameters **162** that define the budgetary categories for which summary information is to be generated. Once the appropriate profile, or profiles, if there are multiple customer profile

10 databases, have been determined, then in step **228**, the billing analysis system applies the pricing data contained in the profiles to the rated call to produce a priced call value. In step **230**, the billing analysis system generates summary information updates defined by the budgetary parameters based on the priced call value. In step **232**, the priced call value (processed AMA record) is

15 stored in the CDD and the summary information update for the customer is stored in the SD. Once the summary information update is stored, the updated summary information is available for use in call setup processing, as shown in Fig. 2a.

As described in relation to Fig. 1a, an alternative scheme is to store

20 both the priced call value and current bill - collectively termed "the priced call

data" - in the SD; in which case, step **212** would involve storing the priced call value and the current bill in the SD.

Referring now to Fig. 3, there is shown an alternative embodiment of a telephone system in accordance with the present invention. The customer
5 profiles are not shown, but are similar to those shown in Fig. 1b. As shown in the figure, a call may be initiated at a first telephone **302** and directed to a second telephone **304**. The call is routed by a network switch **306**, which generates an AMA record **310** for the call. The AMA record is passed to a billing analysis system **312** which applies customer specific pricing data to
10 the AMA record to produce a processed AMA record. The AMA record and processed AMA record are then passed to a CDD **308** for storage.

Like the billing analysis system of Fig. 1b, the billing analysis system of Fig. 3 includes a SD **313**. The billing analysis system of Fig. 3 also includes an integrated customer profile - although, it should be noted that for
15 simplicity of presentation the individual customer profile databases and the bill generation system are not shown in Fig. 3, nor in the figures that follow. Also, like the billing analysis system of Fig. 1a, the billing analysis system of Fig. 3 accumulates summary information as each individual call record is received and rated in real-time, the summary information being stored in the
20 SD **313**. As in the prior described embodiment, alternative schemes may be

employed for the storage of the AMA records, processed AMA records, and summary information.

Fig. 4 shows another embodiment of a telephone system in accordance with the present invention. The customer profiles are not shown, but are
5 similar to those shown in Fig. 1b. In the Figure 4 embodiment, as in the previous embodiments, a call initiated at a first telephone **402** may be directed to a second telephone **404** through a network switch **406**, which generates an AMA record **410**. However, in the Fig. 4 embodiment the AMA record is passed to a Rating Complex (RC) **412**. The RC is a unit which performs the
10 functions of the CDD and billing analysis system, and may therefore be characterized as a combined CDD and billing analysis system. As shown in the figure, the RC may include a SD **413** for storing the summary information separately from the AMA records and processed AMA records. As in the prior described embodiments, alternative schemes may be employed for the
15 storage of the AMA records, processed AMA records, and summary information.

It should be noted that although all three embodiments discussed above depict a call as being initiated from a first telephone and directed to a second telephone, it is possible that calls may be initiated by, and directed to, many
20 different types of communication devices. For example, a call may be

initiated by a fax machine and directed to a personal computer. Moreover, a call may be initiated by a single communication device and directed to multiple communication devices. For example, a call may be initiated by a fax machine and directed to multiple independent personal computers. For purposes of this description, each instance of a single initiating call being directed to a different terminating device will be considered an independent call.

Although specific embodiments of the present invention have been described, it will be understood by those of skill in the art that there are other embodiments which are equivalent to the described embodiments. Accordingly, it is to be understood that the invention is not to be limited by the specific illustrated embodiments, but only by the scope of the appended claims.

CLAIMS

- 1 1. A method of telephone call processing comprising the steps of:
 - 2 storing customer specific information including pricing data and
 - 3 budget parameters for a customer;
 - 4 storing summary information relating to telephone usage of the
 - 5 customer;
 - 6 receiving a call setup query from a network switch;
 - 7 generating a call setup response based on the budget parameters and
 - 8 the summary information; and
 - 9 transmitting the call setup response to the network switch.
- 1 2. The method of claim 1, wherein the summary information relates to at
 - 2 least one budgetary category, the budget parameters include at least one
 - 3 budgetary limit and the generating step comprises the steps of:
 - 4 determining a budgetary category based on the call setup query and the
 - 5 customer specific information;
 - 6 accessing summary information for the budgetary category;
 - 7 comparing the accessed summary information to the budgetary limit;
 - 8 and
 - 9 generating a call setup response indicating whether the summary
 - 10 information exceeds the budgetary limit.

1 3. The method of claim 2, wherein the customer specific information
2 further includes a call disposition corresponding to the budgetary limit and the
3 call setup response further indicates the call disposition.

1 4. The method of claim 3, wherein the call disposition is defined by the
2 customer.

1 5. The method of claim 1, wherein the step of storing summary
2 information comprises the steps of:

3 receiving a plurality of records, each record describing a telephone
4 call;

5 determining a priced call value for each call using the record and the
6 customer specific data;

7 determining summary information for the customer using the record,
8 the priced call values and the budget parameters; and

9 storing the summary information.

1 6. The method of claim 1, wherein the budget parameters are defined by
2 the customer.

1 7. The method of claim 1, wherein the budget parameters are defined
2 based on a request from the customer

1 8. A method of telephone call processing comprising the steps of:

2 receiving a telephone call from a caller;

3 transmitting a call setup query identifying the caller to a billing
4 analysis system;

5 receiving a call setup response indicating whether summary
6 information of the caller exceeds at least one budgetary limit of the caller; and
7 performing a call disposition based on the call setup response.

1 9. The method of claim 8, wherein the performing step comprises the
2 steps of:

3 completing the call, if the call setup response indicates that no
4 budgetary limit of the caller is exceeded; and

5 rejecting the call, if the call setup response indicates that at least one
6 budgetary limit of the caller is exceeded.

1 10. The method of claim 9, further comprising the step of:
2 playing a message to the caller, if the call is rejected.

1 11. A system for telephone call processing comprising:

2 a first database storing customer specific information including pricing
3 data and budget parameters for a customer;

4 a second database storing summary information; and

5 a billing analysis system, coupled to the first and the second database,
6 comprising:

7 a receiver receiving a call setup query from a network switch,

8 a response generator generating a call setup response based on
9 the budget parameters and the summary information, and
10 a transmitter transmitting the call setup response to the network
11 switch.

1 12. A network switch comprising:

2 a first receiver receiving a telephone call from a caller;
3 a transmitter transmitting a call setup query identifying the caller to a
4 billing analysis system;
5 a second receiver receiving a call setup response indicating whether
6 summary information of the caller exceeds at least one budgetary limit of the
7 caller from the billing analysis system; and
8 a call completion device performing a call disposition based on the call
9 setup response.

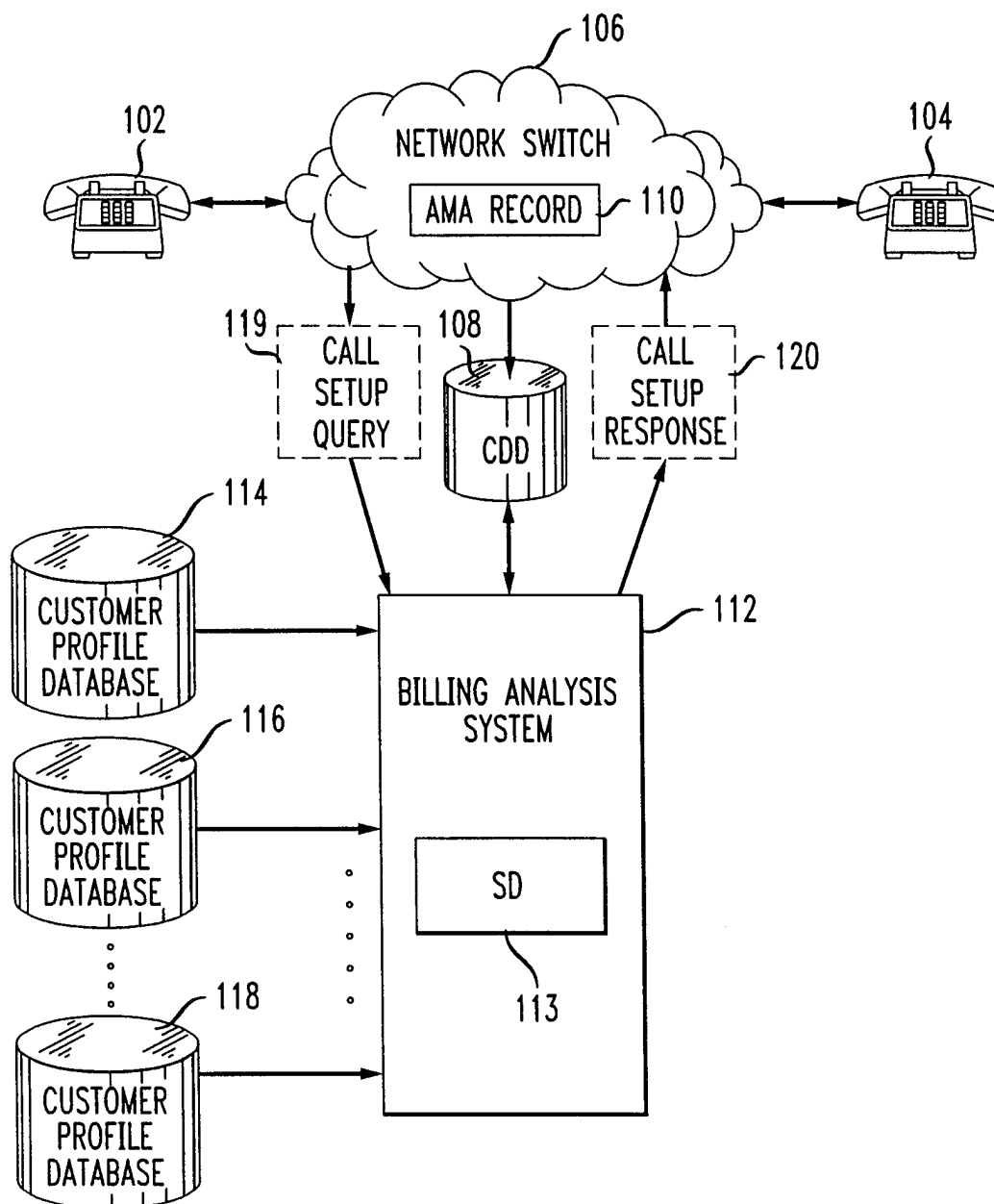
1 13. A system for telephone call processing comprising the steps of:

2 means for storing customer specific information including pricing data
3 and budget parameters for a customer;
4 means for storing summary information; and
5 means for receiving a call setup query from a network switch,
6 means for generating a call setup response based on the budget
7 parameters and the summary information, and

- 8 means for transmitting the call setup response to the network switch.
- 1 14. A network switch comprising:
- 2 means for receiving a telephone call from a caller;
- 3 means for transmitting a call setup query identifying the caller to a
- 4 billing analysis system;
- 5 means for receiving a call setup response indicating whether summary
- 6 information of the caller exceeds at least one budgetary limit of the caller
- 7 from the billing analysis system; and
- 8 means for performing a call disposition based on the call setup
- 9 response.

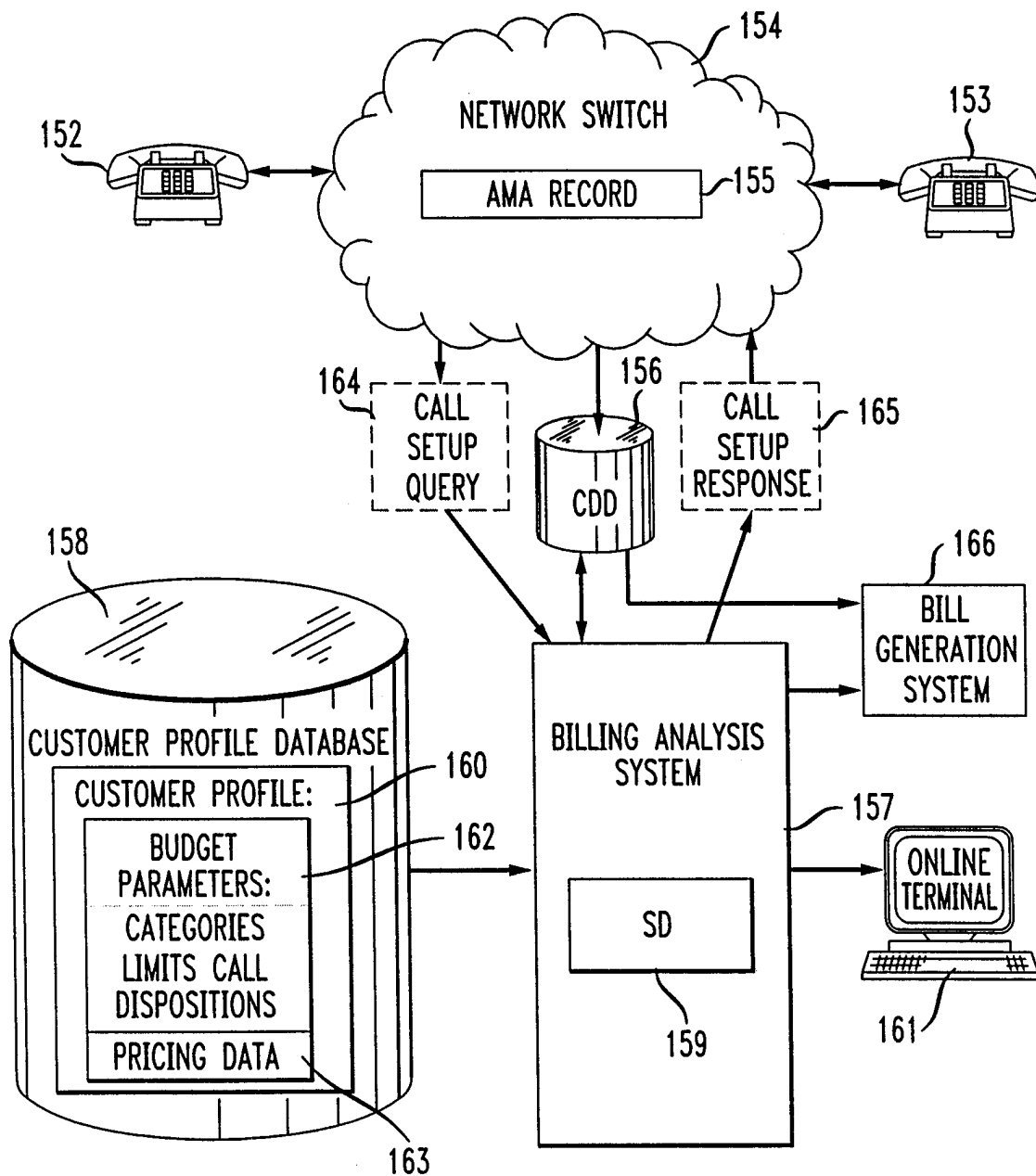
1/5

FIG. 1a



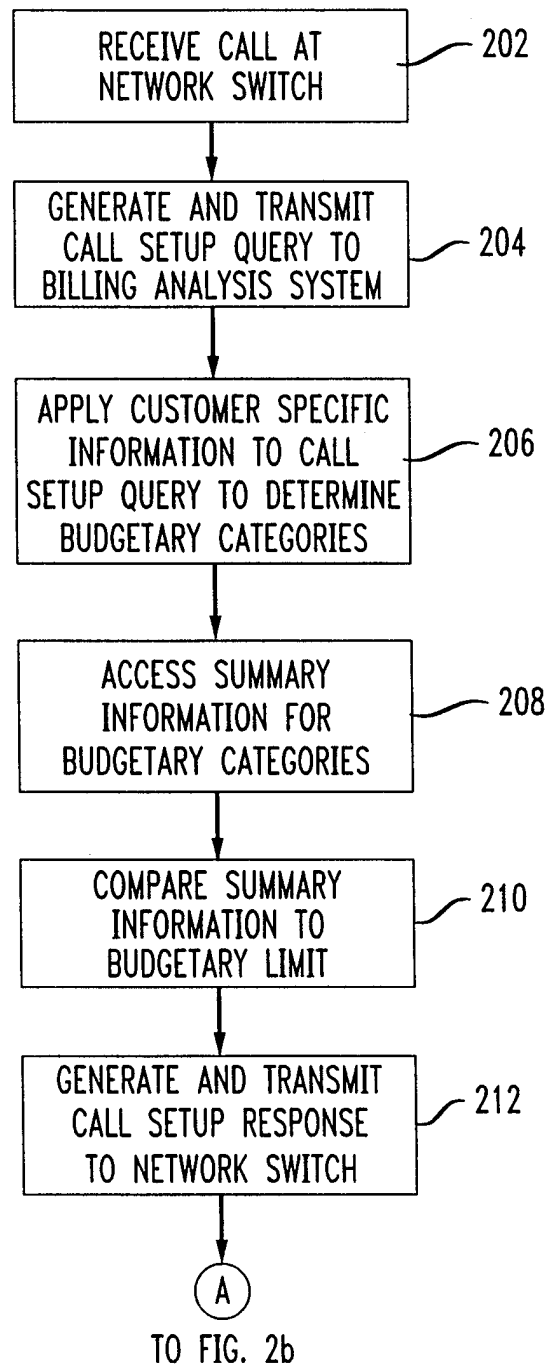
2/5

FIG. 1b



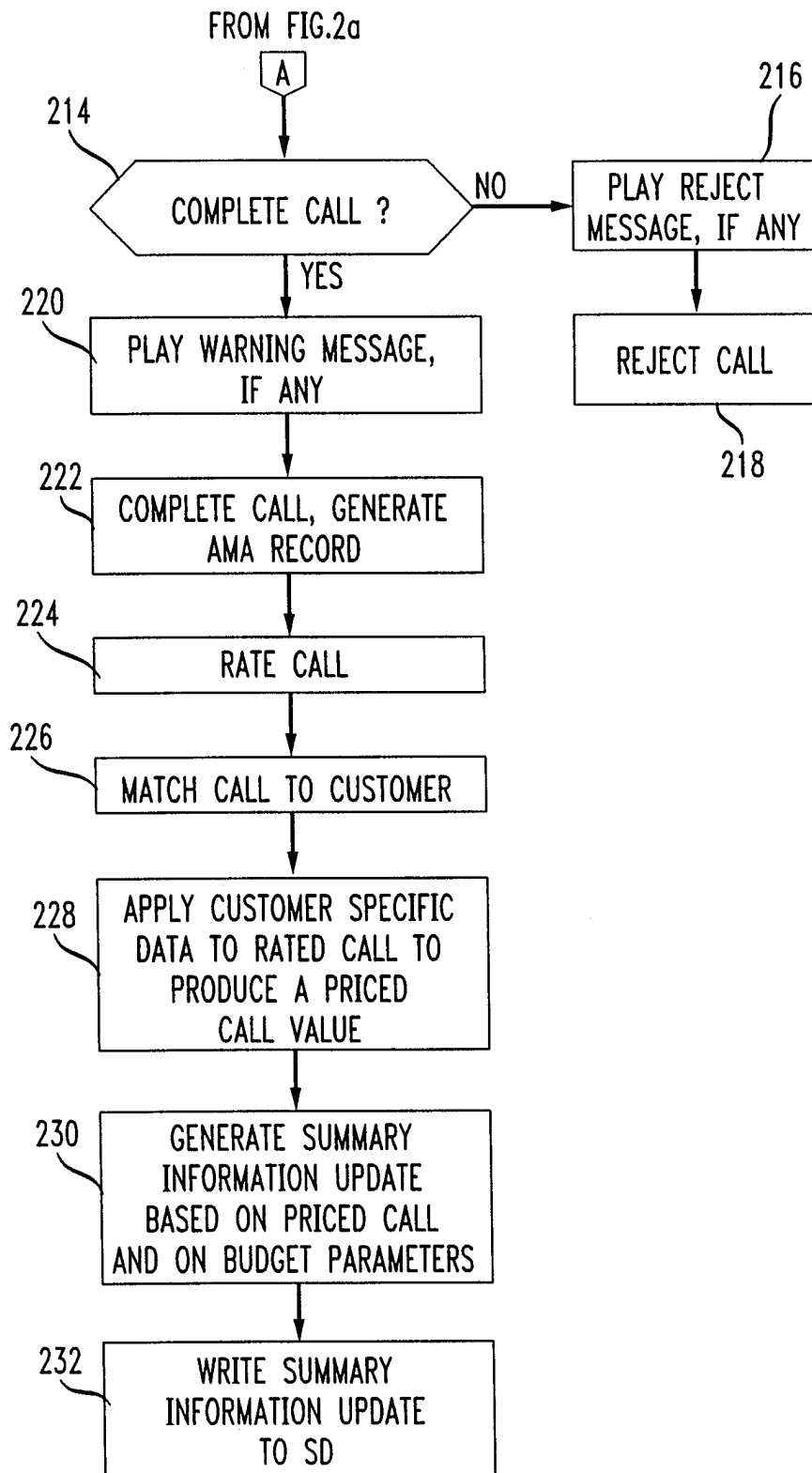
3/5

FIG. 2a



4/5

FIG. 2b



5/5

FIG. 3

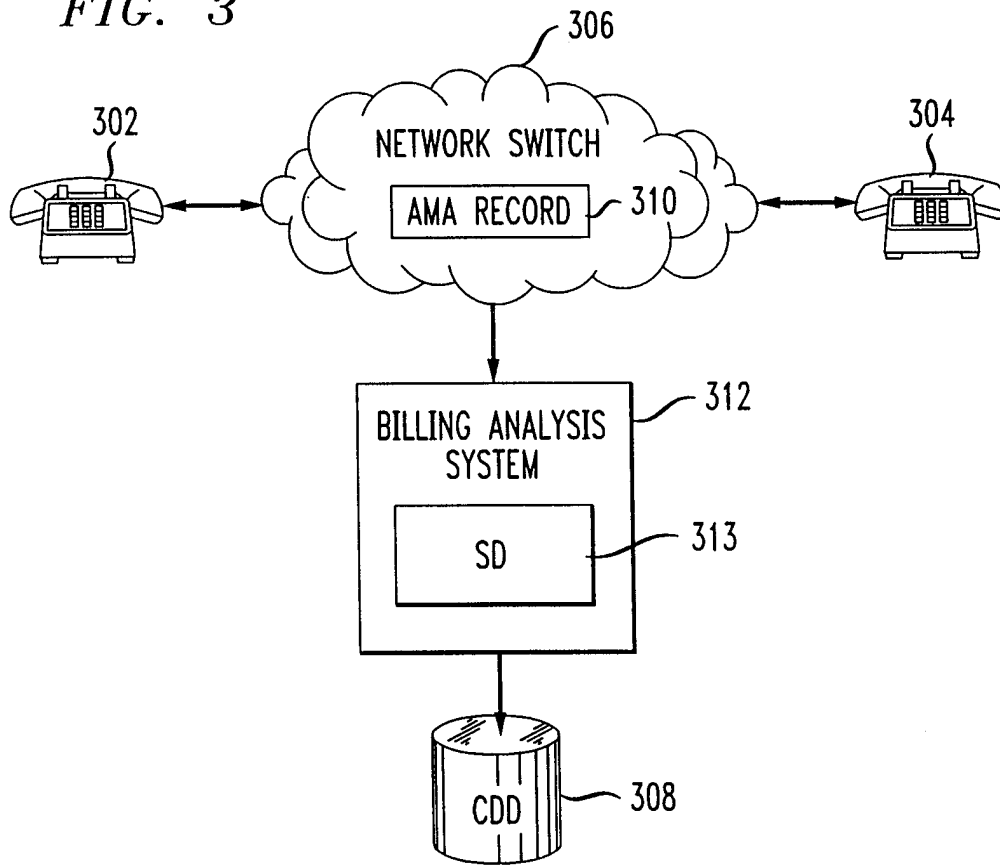
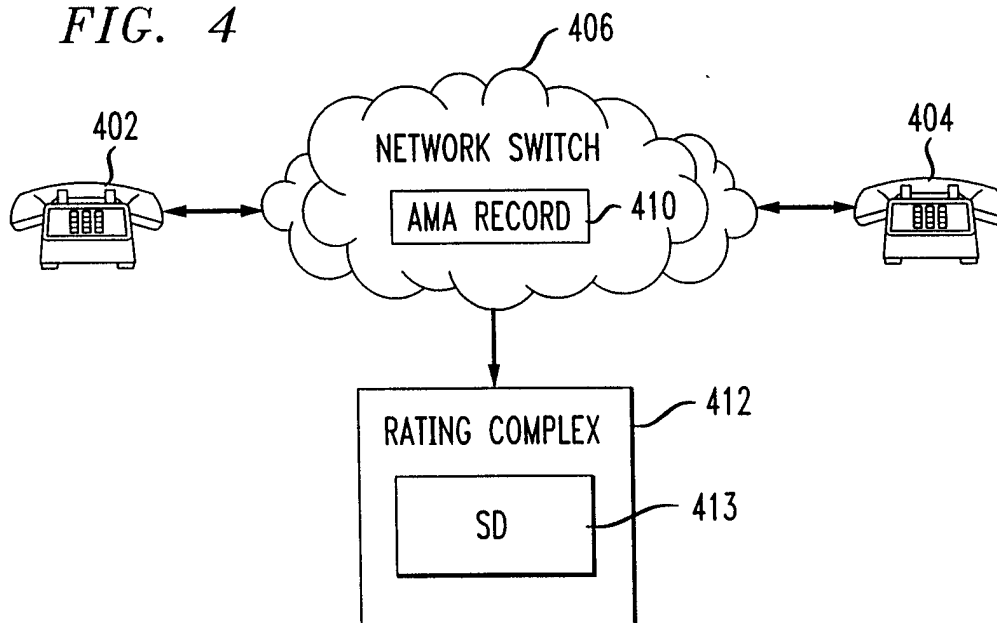


FIG. 4



INTERNATIONAL SEARCH REPORT

In. ational Application No

PCT/US 98/02929

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H04M15/00

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)

IPC 6 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 5 517 555 A (AMADON CHARLES G ET AL) 14 May 1996 see column 1, line 53 - column 2, line 39	1-3, 5, 8-14
Y	---	4, 6, 7
Y	EP 0 705 019 A (AT & T CORP) 3 April 1996 see column 1, line 43 - column 2, line 13 -----	4, 6, 7



Further documents are listed in the continuation of box C.



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

28 May 1998

Date of mailing of the international search report

05/06/1998

Name and mailing address of the ISA

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

Authorized officer

Nygren, P

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/US 98/02929

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5517555 A	14-05-1996	AU 3238793 A	19-07-1993
		WO 9312606 A	24-06-1993
EP 0705019 A	03-04-1996	US 5559871 A	24-09-1996
		CA 2154602 A	24-03-1996
		JP 8191357 A	23-07-1996