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(54) Abstract Title
Apparatus for generating billing data for subscribers having pre-allocated usage on a number of different networks

(57) A method and/or apparatus for generating billing data for subscribers of a service centre providing services on a number of different telephone networks comprising a data storage means storing allocated usage for at least one category of call for a subscriber and the telephone networks for which the allocated usage is applicable and a data processing means for relating said allocated usage to calls made during a billing period, regardless of which of the networks was used to make the call.

GB 2 342 006 A

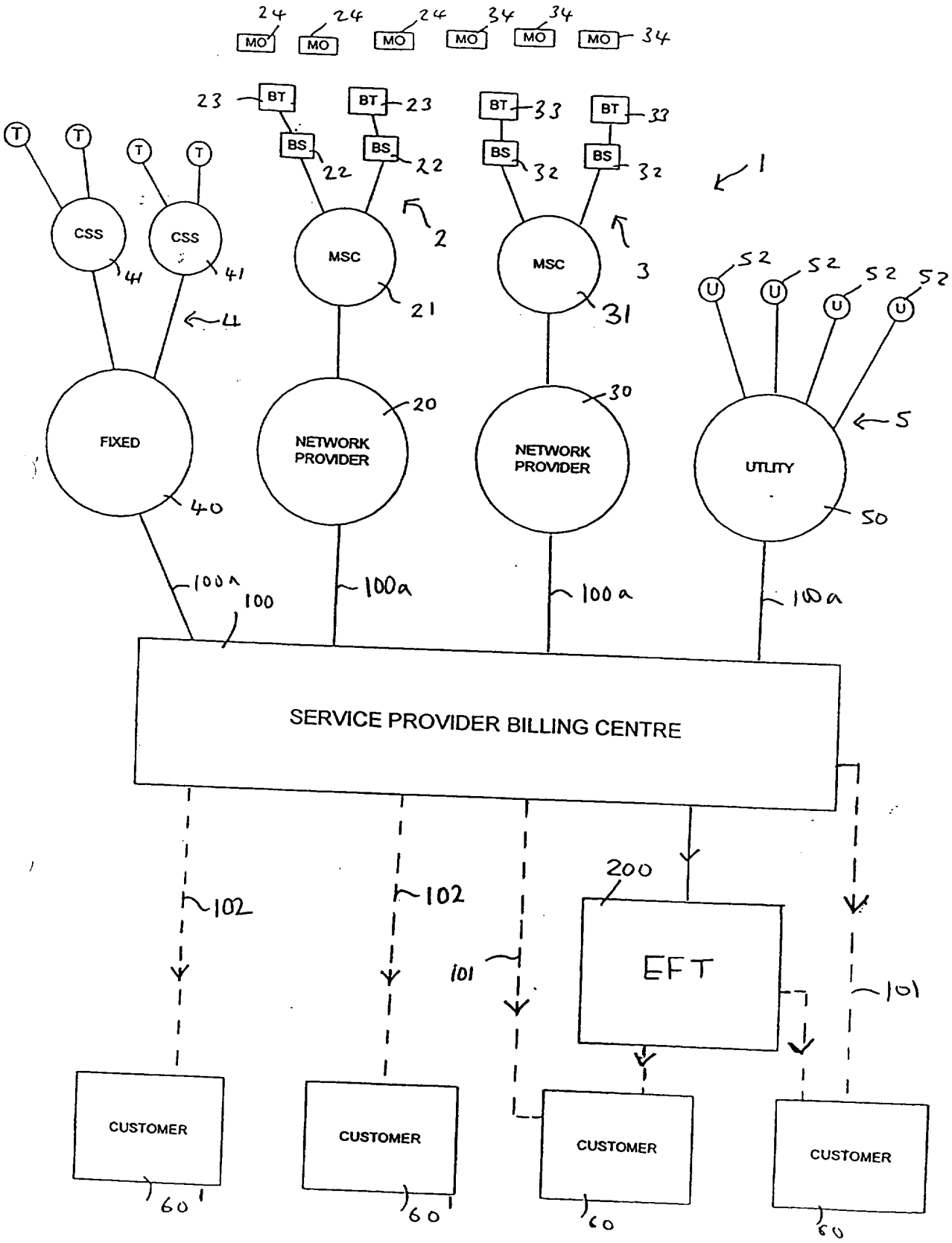
MO
24
34
BT
23
33
BS
22
32
T
CSS
41
MSC
2
21
3
31
1
U
52
5
FIXED
40
NETWORK PROVIDER
20
30
UTILITY
50
100
100a
SERVICE PROVIDER BILLING CENTRE
102
101
200
EFT
CUSTOMER
60

FIG. 1

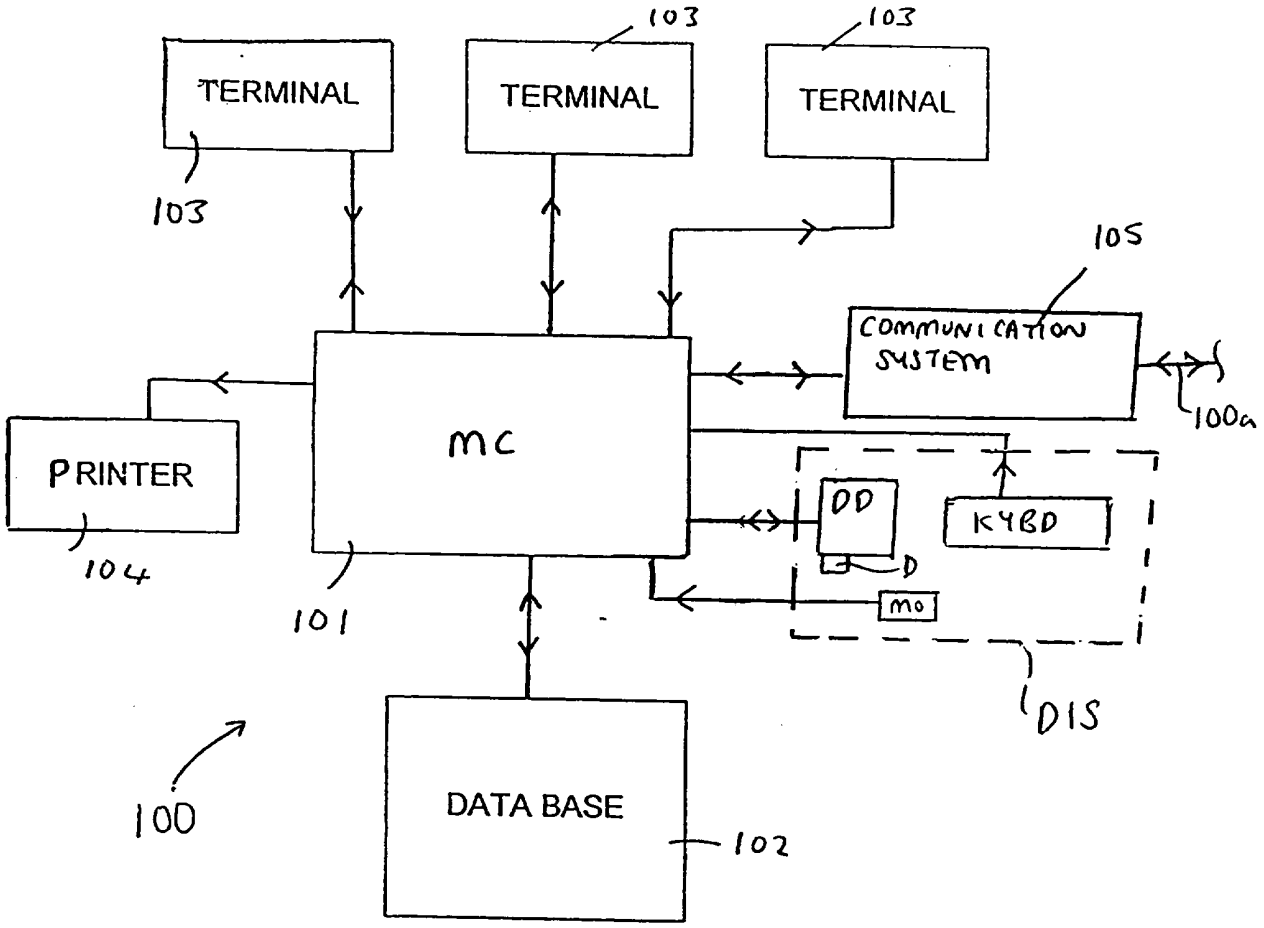
TERMINAL
TERMINAL
TERMINAL
103
103
103
105
COMMUNICATION SYSTEM
100a
MC
PRINTER
104
101
DD
D
KYBD
MO
DIS
100
DATA BASE
102

FIG. 2

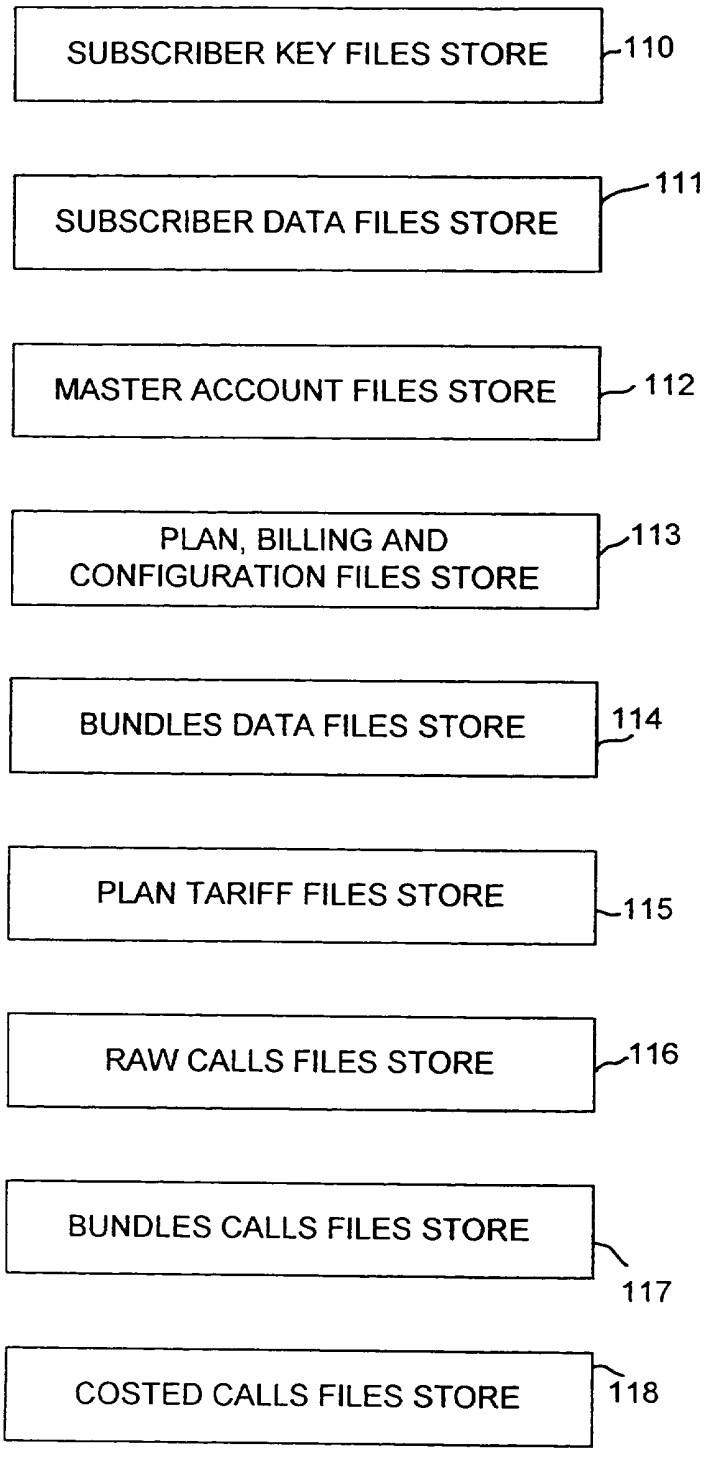
SUBSCRIBER KEY FILES STORE
110
SUBSCRIBER DATA FILES STORE
111
MASTER ACCOUNT FILES STORE
112
PLAN, BILLING AND CONFIGURATION FILES STORE
113
BUNDLES DATA FILES STORE
114
PLAN TARIFF FILES STORE
115
RAW CALLS FILES STORE
116
BUNDLES CALLS FILES STORE
117
COSTED CALLS FILES STORE
118

FIG. 3

SUBSCRIBER KEY FILE	
ACCOUNT NUMBER	
PRIMARY MOBILE NUMBER	
NAME	
POSTCODE	
ESN/SIM	
NETWORK IDENTIFIER	
CREDIT DETAILS	
PLAN IDENTIFIER	

FIG. 4

SUBSCRIBER DATA FILE	
ACCOUNT NUMBER	
MASTER ACCOUNT NUMBER	
TARIFF PLAN IDENTIFIER	
SERVICE IDENTIFIERS	
AMOUNT/DATE/PAYMENT OF LAST BILL	
CONTACT NAME	
ADDRESS	
CONTACT TELEPHONE NUMBERS	
BILL TYPE/CYCLE	
VALUE UNBILLED CALLS	
DIRECT DEBIT INFORMATION	

FIG. 5

PLAN AND BILLING CONFIGURATION				
LENGTH CYCLE				
START/END CYCLE				
NETWORK NAME				
PLAN NAME				
PLAN TYPE				
SERVICES	S1	S2	S3	S4
NAME				
CHARGE				
COST ADD				
COST REMOVE				
NETWORK NAME AND CHARGE				
COST MONTH				
COST PART MONTH				
DIFFERENT TARIFF				

BUNDLES APPLICABLE	AMOUNT	DATE
B1		
B2		
B3		
B4		

FIG. 6

BUNDLES DATA FILE			
ACCOUNT NUMBER			
BUNDLES	UNITS AVAILABLE	UNITS USED	COUNTDOWN
B1			
B2			
B3			
B4			
DATE, TIME LAST CALL			
BILL CYCLE			
CALL COST TOTAL			
TARIFF INDICATOR			
SERVICES	START	END	
S1			
S2			
S3			
S4			

FIG.7

PLAN TARIFF FILE		
CHARGE RATE		
Day 1	0.00-0.30	CT1
Day 1	0.30-01.00	CT1
Day 2	18.00-18.30	CT2
Day 3	20.00-20.30	CT3
Day 7	14.00-14.30	CT4
Day 7	23.30-0.00	CT4

ZONE 1 CT1							
	MIN	MIN UNIT	MIN MIN	CHAR UNIT	CHAR MIN	MAX	BUN
DB1							
DB2							
DB3							
DB40							

ZONE 1 CT2

ZONE 2 CT1

ZONE 4 CT4

FIG.8

NOMINATED NAMES			
ACCOUNT NUMBER			
NAME	MNEMONIC	TEL NO	DB

FIG.9

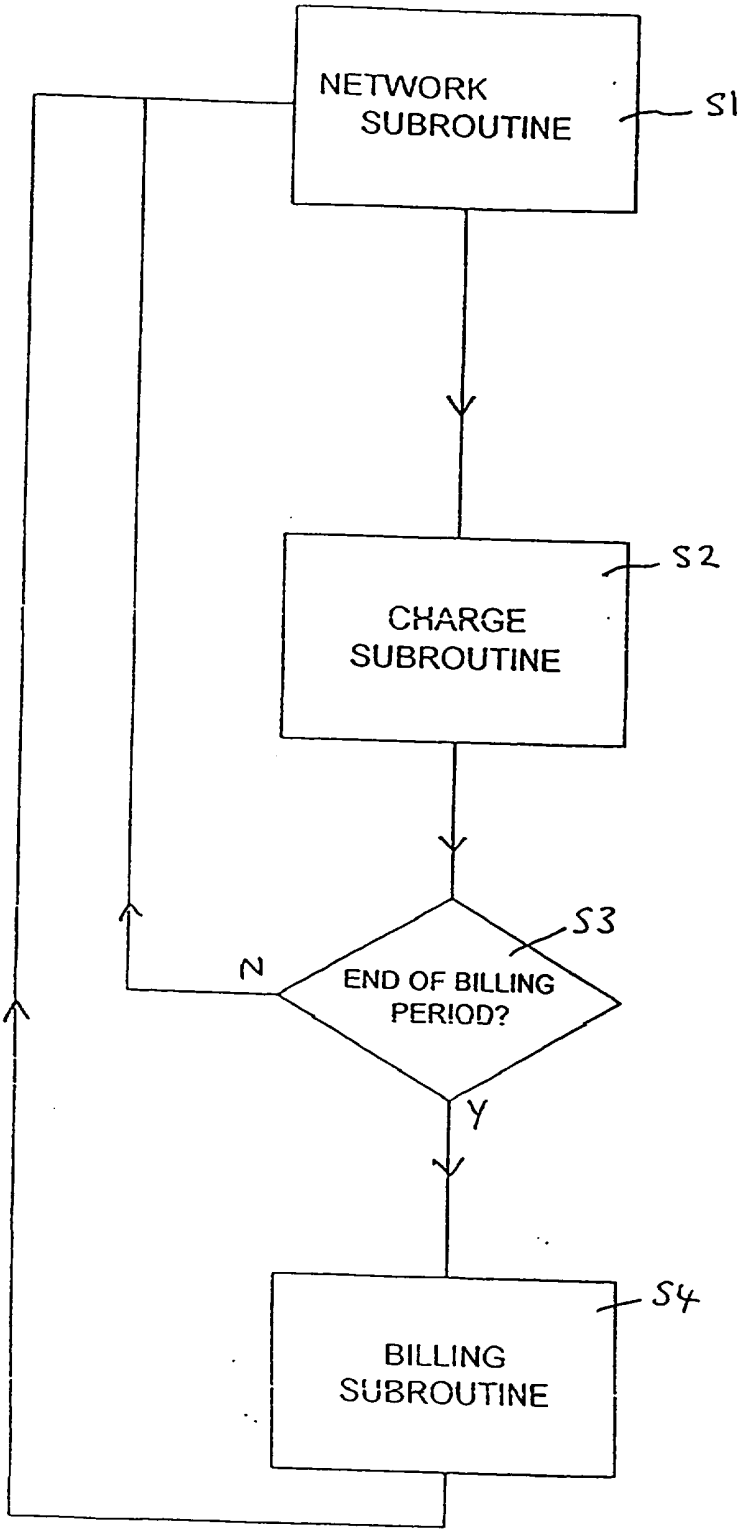
NETWORK SUBROUTINE
S1
CHARGE SUBROUTINE
S2
END OF BILLING PERIOD?
S3
N
Y
BILLING SUBROUTINE
S4

FIG. 10

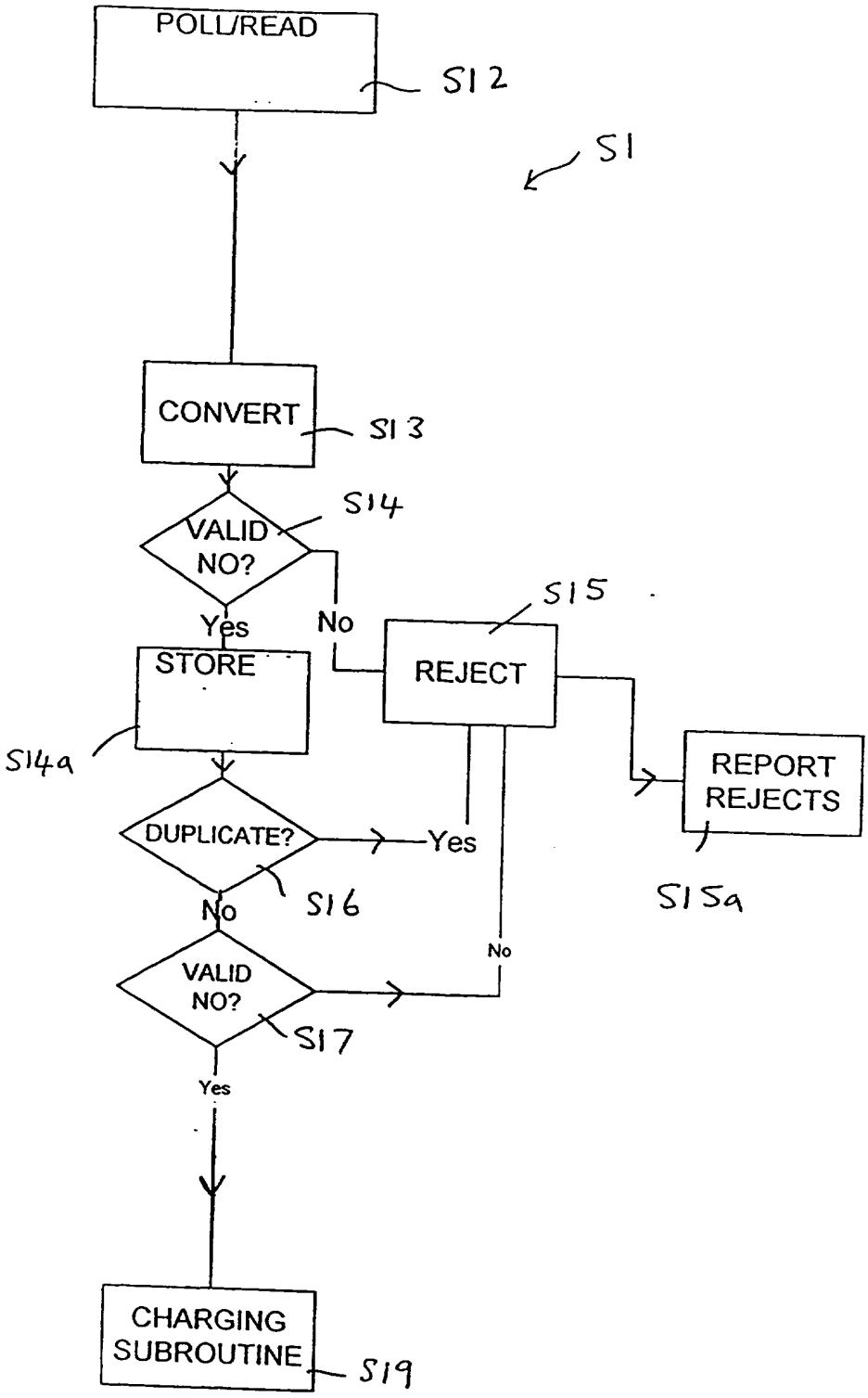
POLL/READ
S12
S1
CONVERT
S13
VALID NO?
S14
Yes
No
S15
STORE
REJECT
S14a
REPORT REJECTS
DUPLICATE?
Yes
S16
S15a
No
No
VALID NO?
S17
Yes
CHARGING SUBROUTINE
S19

FIG. 11

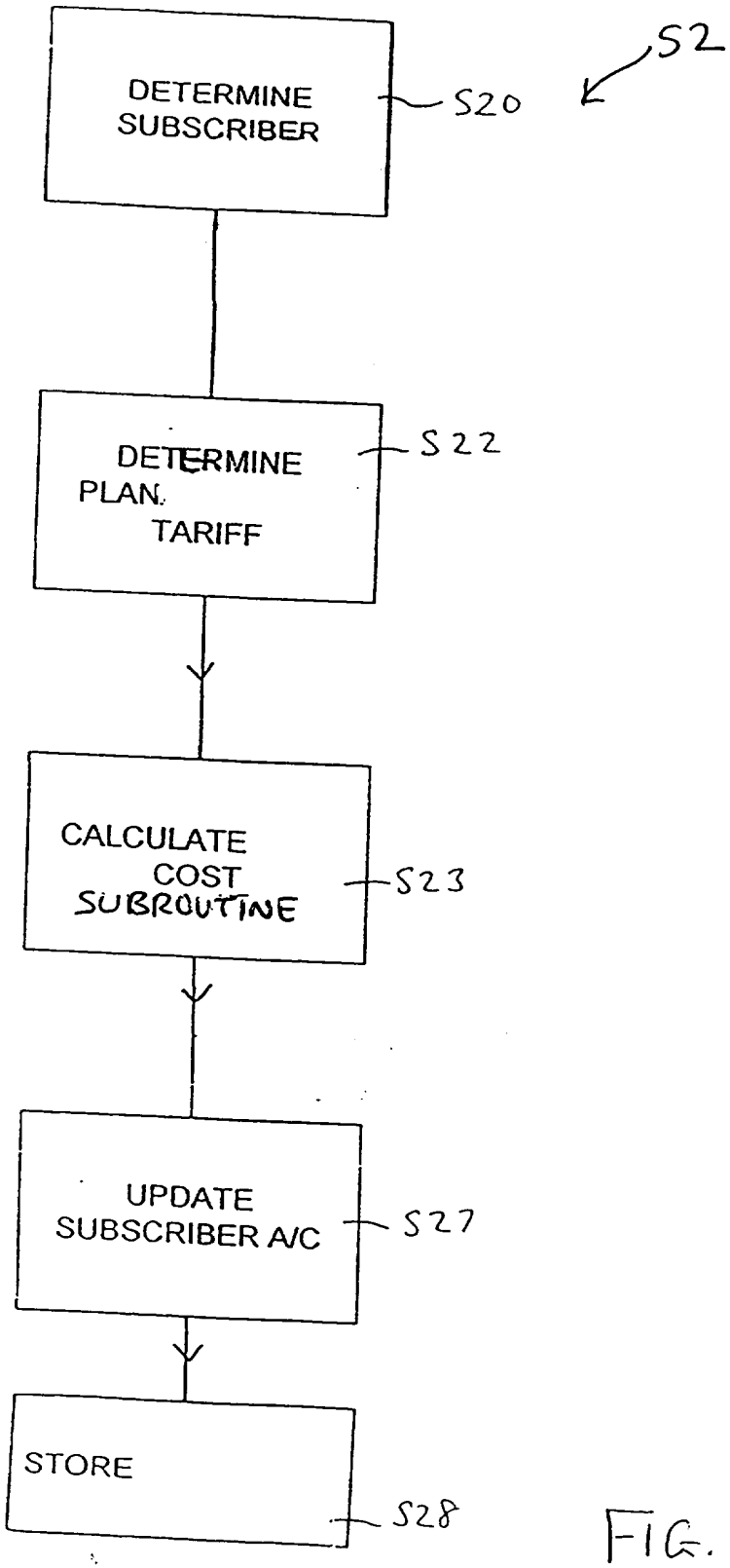
S2
DETERMINE SUBSCRIBER
S20
DETERMINE PLAN. TARIFF
S22
CALCULATE COST SUBROUTINE
S23
UPDATE SUBSCRIBER A/C
S27
STORE
S28

FIG. 12

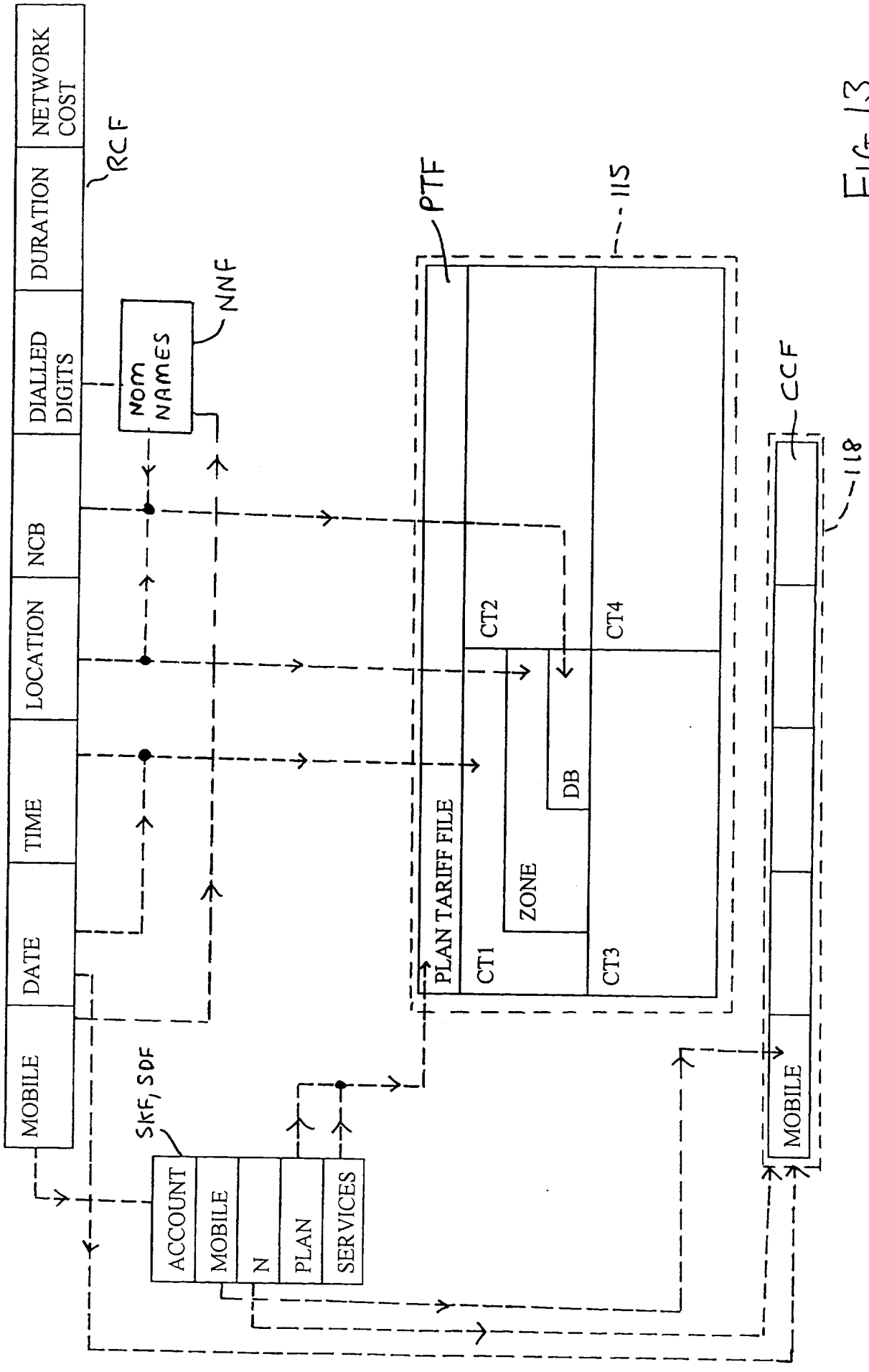
MOBILE
DATE
TIME
LOCATION
NCB
DIALLED DIGITS
DURATION
NETWORK COST
RCF
NOM NAMES
NNF
PTF
115
PLAN TARIFF FILE
CT1
ZONE
CT2
DB
CT3
CT4
CCF
118
MOBILE
SKF, SDF
ACCOUNT
MOBILE
N
PLAN
SERVICES

FIG. 13

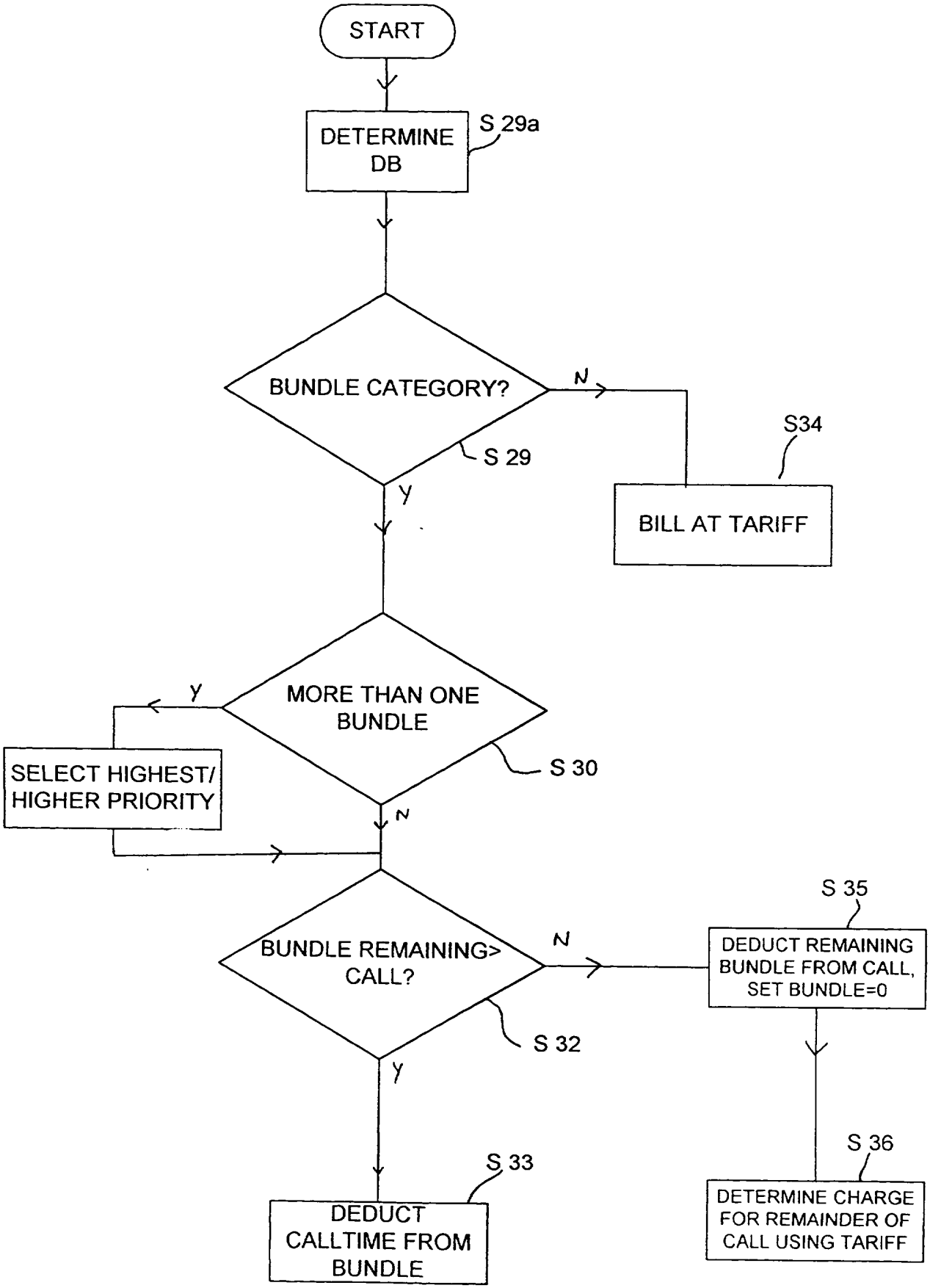
START
DETERMINE DB
S 29a
BUNDLE CATEGORY?
S 29
N
S34
BILL AT TARIFF
Y
MORE THAN ONE BUNDLE
S 30
Y
SELECT HIGHEST/ HIGHER PRIORITY
N
BUNDLE REMAINING> CALL?
S 32
N
S 35
DEDUCT REMAINING BUNDLE FROM CALL, SET BUNDLE=0
S 36
DETERMINE CHARGE FOR REMAINDER OF CALL USING TARIFF
Y
S 33
DEDUCT CALLTIME FROM BUNDLE

FIG. 14

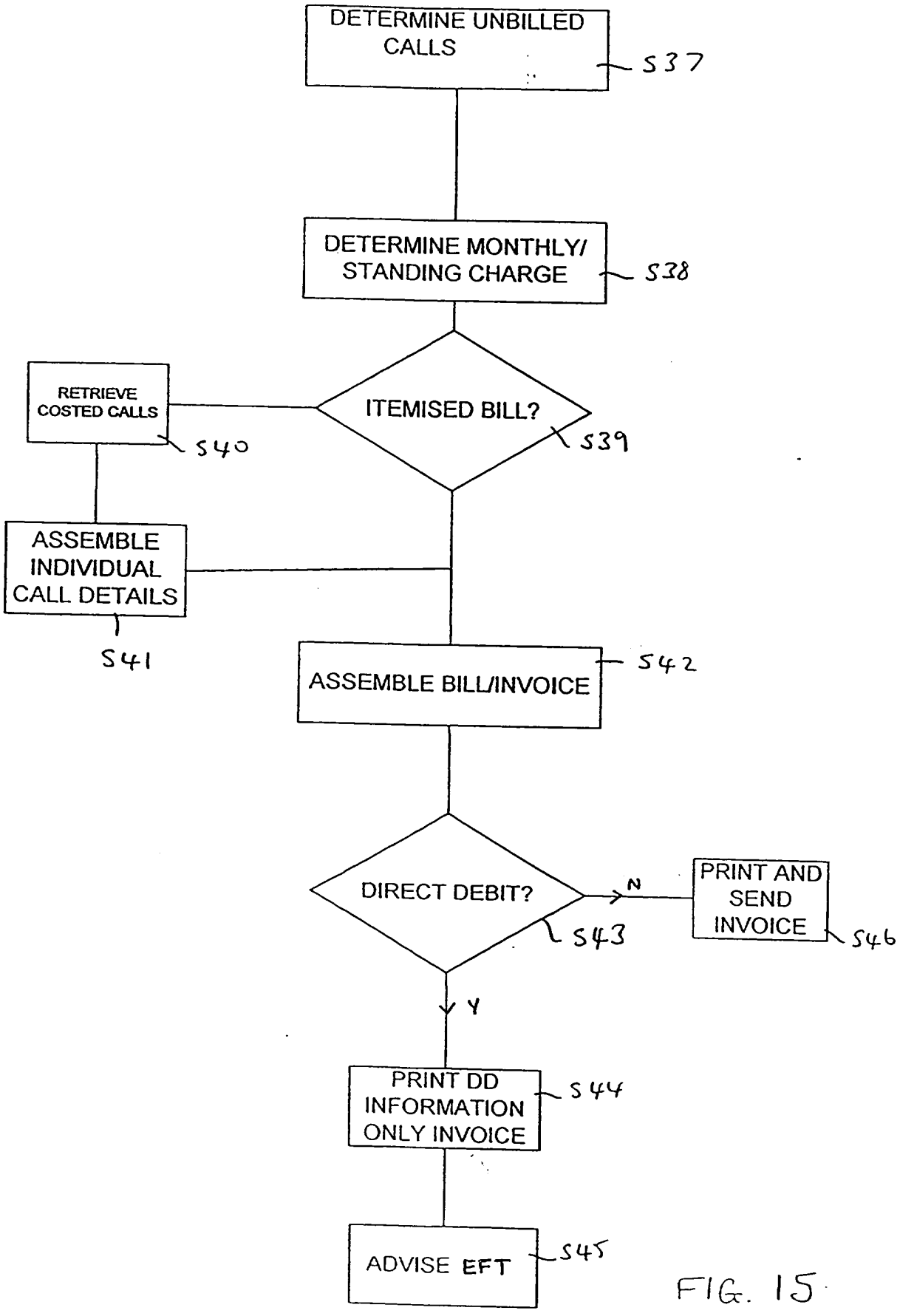
DETERMINE UNBILLED CALLS
S37
DETERMINE MONTHLY/ STANDING CHARGE
S38
ITEMISED BILL?
S39
RETRIEVE COSTED CALLS
S40
ASSEMBLE INDIVIDUAL CALL DETAILS
S41
ASSEMBLE BILL/INVOICE
S42
DIRECT DEBIT?
S43
N
PRINT AND SEND INVOICE
S46
Y
PRINT DD INFORMATION ONLY INVOICE
S44
ADVISE EFT
S45

FIG. 15

INVOICE NO: xxxxxxxx

For information only settlement is by direct debit

Invoice

Statement

dd/mm/yy	balance	£xx.yy
dd/mm/yy	direct debit	-£xx.yy

Mobile Tel No: xxxxxxx

Mobile Call Cost	£vv.bb
Monthly Charge	£nn.oo
Total cost (ex Vat)	£
VAT @ 17.5%	£
Total this invoice	£

FIG. 16a

INVOICE NO: xxxxxxxx

Call Details

Call Charges Mobile Tel No: xxxxxxx

Date	Time	Dialled Number	Place Dialled	Duration Hrs/Min/Sec	Cost £ ex VAT
13/2/1998	10:00	01234xxxxxx		0:22	£0.xx
15/2/1998	12:07	01771mmmmmm	Vodaphone	0:12	£0.bb
15/2/1998	15:40	004989mmmmm	Munich	0:54	£x.nn
Total (ex VAT)				1:28	£z.mm

FIG. 16b

ADDITIONAL MOBILE BUNDLES DATA FILE			
ADDITIONAL MOBILE NUMBER			
NETWORK ID			
ACCOUNT NUMBER			
BUNDLES	UNITS AVAILABLE	UNITS USED	COUNTDOWN
B1			
B2			
B3			
B4			
DATE, TIME LAST CALL			
BILL CYCLE			
CALL COST TOTAL			
TARIFF INDICATOR			
SERVICES	START	END	
S1			
S2			
S3			
S4			

FIG.17

FIXED TELEPHONE BUNDLES DATA FILE			
ACCOUNT NUMBER			
FIXED TELEPHONE NUMBER			
NETWORK ID			
BUNDLES	UNITS AVAILABLE	UNITS USED	COUNTDOWN
B1			
B2			
B3			
B4			
DATE, TIME LAST CALL			
BILL CYCLE			
CALL COST TOTAL			
TARIFF INDICATOR			
SERVICES	START	END	
S1			
S2			
S3			
S4			

FIG. 18

UTILITY BUNDLES DATA FILE			
ACCOUNT NUMBER			
UTILITY REFERENCE NUMBER			
BUNDLES	UNITS AVAILABLE	UNITS USED	COUNTDOWN
B1			
B2			
BILL CYCLE			
COST TOTAL			
TARIFF INDICATOR			
SERVICES	START	END	
S1			
S2			

FIG. 19

PLAN AND BILLING CONFIGURATION				
LENGTH CYCLE				
START/END CYCLE				
NETWORK NAME				
PLAN NAME				
PLAN TYPE				
SERVICES	S1	S2	S3	S4
NAME				
CHARGE				
DIFFERENT TARIFF				
BUNDLES APPLICABLE	AMOUNT		DATE	
B1				
B4				
FIXED TELEPHONE				
SERVICES	S1	S2	S3	S4
NAME				
COST MONTH				
DIFFERENT TARIFF				
BUNDLES APPLICABLE	AMOUNT		DATE	
B1				
B4				
UTILITY				
SERVICES	S1		S2	
CHARGE				
BUNDLES APPLICABLE	AMOUNT		DATE	
B1				
B2				

FIG. 20

FIG. 20

PLAN TARIFF FILE					
CHARGE RATE					
		N1	N2	FXD	UTIL
Day 1	0.00-0.30	CT1	CT1	CT5	CT10
Day 1	0.30-01.00	CT1	CT1	CT5	CT10
Day 2	18.00-18.30	CT2	CT2	CT6	CT11
Day 3	20.00-20.30	CT3	CT3	CT7	CT11
Day 7	14.00-14.30	CT4	CT4	CT8	CT11
Day 7	23.30-0.00	CT4	CT4	CT8	CT10

ZONE 1 CT1							
	MIN	MIN UNIT	MIN MIN	CHAR UNIT	CHAR MIN	MAX	BUN
DB1							
DB2							
DB3							
DB40							

ZONE 1 CT2

ZONE 2 CT1

ZONE 4 CT4

ZONE 1 CT5

	MIN	MIN UNIT	MIN MIN	CHAR UNIT	CHAR MIN	MAX	BUN
DBx							
DB40							

ZONE 1 CT8

CT10	XX PER UNIT
CT11	YY PER UNIT

FIG.21

MASTER BUNDLES DATA FILE			
DUMMY MOBILE NUMBER			
ACCOUNT NUMBER			
BUNDLES	UNITS AVAILABLE	UNITS USED	COUNTDOWN
B1			
B2			
B3			
B4			
DATE, TIME LAST CALL			
BILL CYCLE			
CALL COST TOTAL			
TARIFF INDICATOR			
SERVICES	START	END	
S1			
S2			
S3			
S4			

FIG. 22

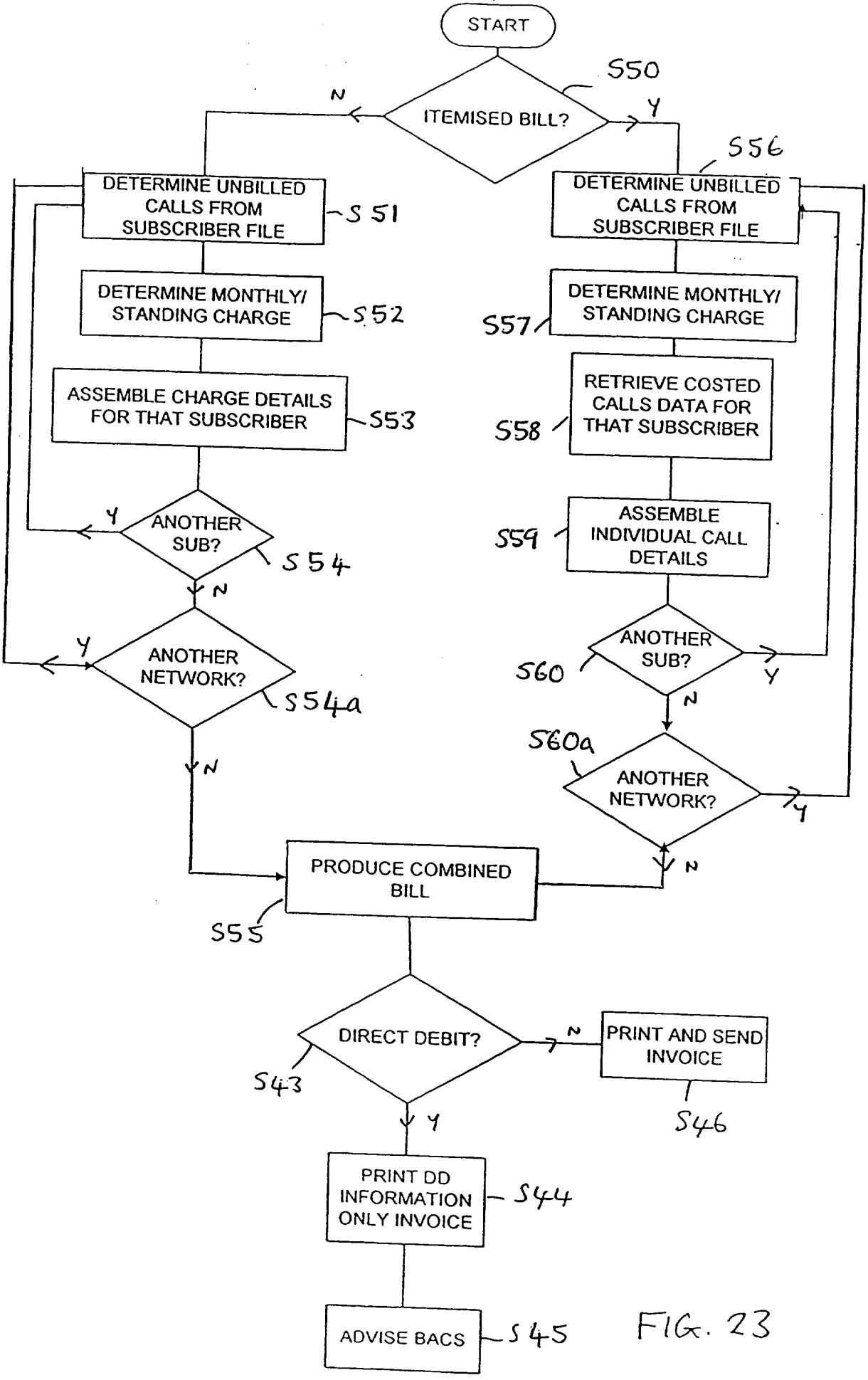
START
ITEMISED BILL?
S50
N
Y
DETERMINE UNBILLED CALLS FROM SUBSCRIBER FILE
S51
DETERMINE MONTHLY/ STANDING CHARGE
S52
ASSEMBLE CHARGE DETAILS FOR THAT SUBSCRIBER
S53
ANOTHER SUB?
S54
ANOTHER NETWORK?
S54a
DETERMINE UNBILLED CALLS FROM SUBSCRIBER FILE
S56
DETERMINE MONTHLY/ STANDING CHARGE
S57
RETRIEVE COSTED CALLS DATA FOR THAT SUBSCRIBER
S58
ASSEMBLE INDIVIDUAL CALL DETAILS
S59
ANOTHER SUB?
S60
ANOTHER NETWORK?
S60a
PRODUCE COMBINED BILL
S55
DIRECT DEBIT?
S43
PRINT AND SEND INVOICE
S46
PRINT DD INFORMATION ONLY INVOICE
S44
ADVISE BACS
S45

FIG. 23

INVOICE NO: xxxxxxxx

For information only settlement is by direct debit

Invoice	Statement		
	dd/mm/yy	balance	£xx.yy
	dd/mm/yy	direct debit	-£xx.yy
Network:			
Mobile Tel No: xxxxxxx			
Mobile Call Cost		£vv.bb	
Monthly Charge		£nn.oo	
Total cost (ex Vat) for Mobile Tel No: yyyyyyy	**£**		
Network:			
Mobile Tel No: yyyyyyy			
Mobile Call Cost		£mm.bb	
Monthly Charge		£n.oo	
Total cost (ex Vat) for Mobile Tel No: yyyyyyy	**£**		
Network:			
Mobile Tel No: zzzzzzzz			
Mobile Call Cost		£bb..bb	
Monthly Charge		£n.oo	
Total cost (ex Vat) for Mobile Tel No: yyyyyyy	**£**		
Invoice Total (ex VAT)	**£**		
VAT @ 17.5%	**£**		
Total this invoice	**£**		

FIG. 24a

INVOICE NO: xxxxxxxx Call Details

Call Charges Mobile Tel No: xxxxxxx

Date	Time	Dialled Number	Place Dialled	Duration Hrs/Min/Sec	Cost £ ex VAT
13/2/1998	10:00	01234xxxxxx		0:22	£0.xx
15/2/1998	12:07	01771mmmmmm	Vodaphone	0:12	£0.bb
15/2/1998	15:40	004989mmmmm	Munich	0:54	£x.nn
Total (ex VAT)				1:28	£z.mm

Call Charges Mobile Tel No: yyyyyyy

Date	Time	Dialled Number	Place Dialled	Duration Hrs/Min/Sec	Cost £ ex VAT
01/2/1998	09:00	0171 xxxxxxx	Inner London	0:12	£0.cv
06/2/1998	11:08	01483mmmmmm	Guildford	0:16	£0.nn
11/2/1998	15:40	01677mmmmm		0:50	£n.kk
Total (ex VAT)				1:18	£m.np

Call Charges Mobile Tel No:zzzzzzz

Date	Time	Dialled Number	Place Dialled	Duration Hrs/Min/Sec	Cost £ ex VAT
09/2/1998	07:00	01774xxxxxx		0:10	£0.aa
12/2/1998	11:40	001212mmmmm	New York	0:45	£z.bb
Total (ex VAT)				0:55	£w.nm

Grand Total (ex VAT)	£
VAT @17.5%	£
Grand Total	£

FIG. 24b

INVOICE NO: xxxxxxxx

For information only settlement is by direct debit

Invoice	Statement		
	dd/mm/yy	balance	£xx.yy
	dd/mm/yy	direct debit	-£xx.yy
Network:			
Mobile Tel No: xxxxxxx			
Mobile Call Cost		£vv.bb	
Monthly Charge		£nn.oo	
Total cost (ex Vat) for Mobile Tel No: yyyyyyy	£		
Network:			
Mobile Tel No: yyyyyyy			
Mobile Call Cost		£mm.bb	
Monthly Charge		£n.oo	
Total cost (ex Vat) for Mobile Tel No: yyyyyyy	£		
Network:			
Fixed Tel No: xxxxxxx			
Call Cost		£vv.bb	
Line Rental		£nn.oo	
Total cost (ex Vat) for Fixed Tel No.: xxxxxxx		£	
Electricity Account No: xxxxxxx			
units used nn			
@ £0.mm per unit, cost		£vv.bb	
Standing Charge		£nn.oo	
Total (ex Vat) electricity charge		£	
Invoice Total (ex VAT)			
VAT @ 17.5%			
Total this invoice			

FIG. 25

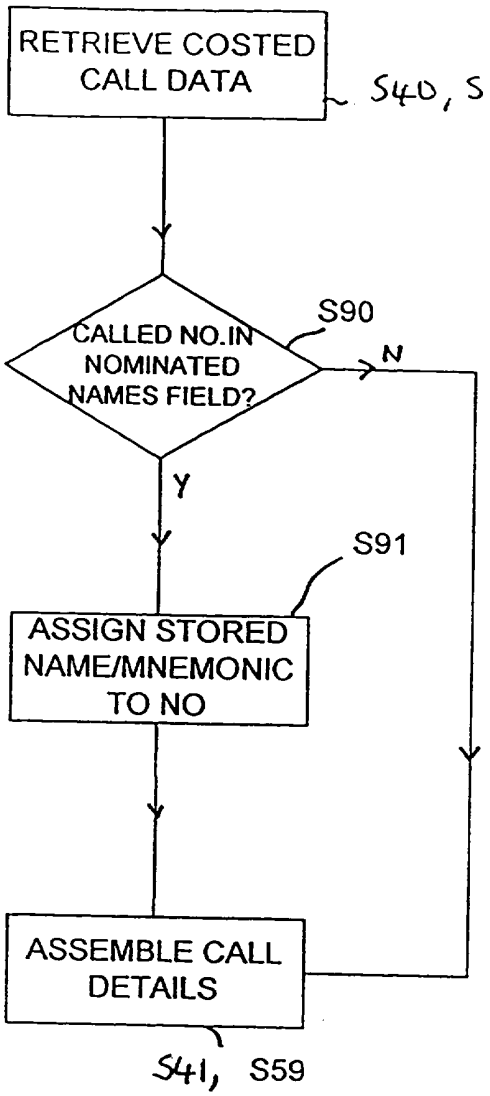
RETRIEVE COSTED CALL DATA
S40, S58
CALLED NO.IN NOMINATED NAMES FIELD?
S90
N
Y
S91
ASSIGN STORED NAME/MNEMONIC TO NO
ASSEMBLE CALL DETAILS
S41, S59

FIG. 26

INVOICE NO: xxxxxxxx

Call Charges Mobile Tel No: xxxxxxx

Date	Time	Dialled No	Name	Place Dialled	Duration Hrs/Min/Sec	Cost £ ex VAT
13/2/1998	10:00	01234xxxxxx			0:22	£0.xx
15/2/1998	12:07	01771mmmmmm	Susan	Vodaphone	0:12	£0.bb
15/2/1998	15:40	004989mmmmm	Heinz	Munich	0:54	£x.nn
Total (ex VAT)					1:28	£z.mm

Call Charges Mobile Tel No: yyyyyyy

Date	Time	Dialled Number	Name	Place Dialled	Duration Hrs/Min/ Sec	Cost £ ex VAT
01/2/1998	09:00	0171 xxxxxxx	Office	Inner London	1:12	£n.cv
06/2/1998	11:08	01483mmmmmm	Bank	Guildford	0:16	£0.nn
08/2/1998	18:19	01483mmmmmm	Home	Guildford	0:10	£0.bb
Total (ex VAT)					1:38	£m.np

Call Charges Fixed Tel No: xxxxxxx

Date	Time	Dialled Number	Name	Place Dialled	Duration Hrs/Min/Sec	Cost £ ex VAT
09/2/1998	07:00	01774xxxxxx	David		0:10	£0.aa
09/2/1998	09:08	01997mmmmmm			0:14	£0.zz
12/2/1998	11:40	001212mmmmm	Tom	New York	0:45	£z.bb
Total (ex VAT)					1:09	£w.nm

FIG 27

APPARATUS FOR GENERATING BILLING DATA

This invention relates to apparatus for generating billing data for subscribers of a service centre providing telecommunications and optionally other services, such as the supply of utilities such as gas, electricity or water.

Customers or subscribers to the aforementioned type of services generally periodically receive a separate individual bill for each service charging them with any monthly charge and the usage charges for a given period, for example a month or a quarter.

In the case of mobile telephone communications services, for example the GSM (Global System Mobile) cellular telephone network, it is common for a subscriber to be allocated a predetermined amount of usage when he subscribes to the service. For example, the subscriber may be offered a number of minutes of free call time for each billing period.

It is an aim of the present invention to provide improved flexibility for billing arrangements with subscribers to such services.

In one aspect, the present invention provides

apparatus for generating billing data for subscribers of a service centre providing telecommunications services, wherein a subscriber is pre-allocated a predetermined amount of usage (which may be free usage or usage at a predetermined rate or prepaid usage, for example) for each of a plurality of different categories of calls.

In another aspect, the present invention provides apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising data storage means arranged to store, for each subscriber, pre-allocated usage for calls of each of a plurality of different categories of call and data processing means for relating said allocated usage to calls made during a billing period in order to generate billing data for the subscriber.

In another aspect, the present invention provides apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

data storage means arranged to store for a subscriber allocated usage for calls of each of a plurality of different categories of call;

means for receiving data for each call made using the telecommunications services provided by the service

centre;

means for identifying from the received data the subscriber responsible for paying for the call; and

data processing means for determining from the received data the cost to the subscriber of the call, which data processing means comprises

means for identifying from the received data whether the call falls within one of a plurality of predetermined different usage categories associated with the identified subscriber,

first call costing means for calculating the cost of the call in accordance with a tariff associated with the call when the call does not fall within one of a plurality of different categories associated with the identified subscriber, and

second call costing means for calculating the cost of a call when said category identifying means identifies that the call falls within one of a plurality of different usage categories associated with the identified subscriber, said second call costing means comprising means for comparing the call usage with the remaining allocated usage for the identified category, means for deducting the call usage from said remaining allocated usage when said remaining allocated usage is greater than the call usage, means for setting the remaining allocated usage to zero and said difference as an excess call usage when said call usage is greater than said remaining

allocated usage and means for calculating the cost of said excess call usage using said tariff when said call usage exceeds said remaining allocated usage.

Examples of different categories of calls include calls originating in an off-peak period; calls to designated numbers; calls to other telephones on the same network; calls to other telephones using telecommunication services provided by the same service centre; calls to other telephones using telecommunication services provided by the service centre where the subscriber is responsible for paying for those calls; calls initiated in a peak period; international calls; calls between mobile telephones (that is telephones using a cellular telephone network); and local calls (that is calls between fixed line telephones (hereinafter referred to as fixed telephones) on the same exchange or calls from a mobile telephone to a fixed telephone in the area where the mobile initiating the call is located and possibly also calls to mobiles on the same network)).

In another aspect, the present invention provides apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, wherein a subscriber is allocated bundled usage for calls of each of a plurality of different categories of call and when a call falls in two

or more such categories, the category of highest or higher priority is used.

In another aspect, the present invention provides apparatus for generating billing data for subscribers of a service centre providing services on a number of different telephone networks which may be either fixed or mobile telephone networks or a combination thereof, wherein a subscriber is allocated usage for at least one category of call and, in use, the allocated usage is related or used in relation to any call within that category made during a billing period, regardless of which of the networks to which the subscriber subscribes was used to make the call.

In another aspect, the present invention provides apparatus for generating billing data for subscribers of a service centre providing services on number of different telephone networks, comprising:

data storage means arranged to store allocated usage for at least one category of call for a subscriber and the telephone networks for which the allocated usage is applicable;

means for receiving data for each call made using the telecommunications services provided by the service centre;

means for identifying from the received data the

subscriber responsible for paying for the call and the associated telephone network; and

data processing means for determining from the received data the cost to the subscriber of the call, which data processing means comprises

means for identifying from the received data whether the call falls within an allocated usage category associated with the subscriber responsible for paying for the call,

first call costing means for calculating the cost of the call in accordance with a tariff associated with the call when the call does not fall within an allocated usage category associated with the identified subscriber, and

second call costing means for calculating the cost of a call when said category identifying means identifies that the call falls within an allocated usage category associated with the identified subscriber regardless of which of the telephone networks for which the allocated usage is applicable was used to make the call, said second call costing means comprising means for comparing the call usage with the remaining allocated usage for the category of call, means for deducting the call usage from said remaining allocated usage when said remaining allocated usage is greater than said call usage, means for setting the remaining allocated usage to zero and said difference between the remaining allocated usage and

the call usage as an excess call usage when said call usage is greater than said remaining allocated usage and means for calculating the cost of said excess call usage using said tariff when said call usage exceeds said remaining allocated usage.

This arrangement means that a subscriber can make efficient use of allocated or bundled usage without having to use a particular telephone network for the call to take advantage of the bundled or allocated usage.

The allocated amount of usage for each category of call may be varied in accordance with the requirements of the subscriber. Also, the subscriber may be allowed to select the categories of calls for which he is allocated usage. The allocated usage may be, for example, free or prepaid usage.

In another aspect, the present invention provides apparatus for generating billing data for subscribers of a service centre providing services on a plurality of different networks wherein, in use, a common bill or invoice for all of the networks to which a subscriber subscribes is generated at the request of the subscriber.

In another aspect, the present invention provides apparatus for generating billing data for subscribers of

a service centre providing services on a plurality of different networks, comprising:

data storage means arranged to store for each subscriber details of the network or networks for which the subscriber has a subscription and information as to whether the subscriber requires a combined bill for all or some of the networks when the subscriber subscribes to more than one network;

means for receiving data for each use made of the services provided by the service centre;

means for identifying from the received data the subscriber responsible for paying for the use;

means for determining and storing for each subscriber billing information for usage of a network for which that subscriber is responsible;

means for collating billing information for the usage within a billing period of each service network to which a subscriber subscribes;

means for determining from the data in the data storage means whether the subscriber requires a combined bill for usage on all or some of the networks to which the subscriber subscribes; and

invoice generating means for generating at the end of a billing period a single invoice giving the billing information for all or some of the service networks to which a subscriber subscribes when the combined bill determining means determines that the subscriber requires

such a combined bill.

In another aspect, the present invention provides apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, which enables a bill or invoice to be generated at the end of a billing period identifying one or more telephone numbers called by the subscriber using an associated name or mnemonic provided by the subscriber.

In another aspect, the present invention provides apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

data storage means arranged to store one or more files each associated with a different subscriber and each containing one or more telephone numbers and a respective different identifer associated with each telephone number and chosen by the subscriber;

means for receiving data for each call made using the telecommunications services provided by the service centre;

means for identifying from the received data the subscriber responsible for paying for the call;

means for identifying from the received data whether the call was made to a telephone number stored in such

a file associated with the subscriber and, if so, for determining from that file the identifier associated with that telephone number;

data processing means for calculating the cost of a call; and

means for generating for the subscriber a document which associates the cost of the call with the identifier chosen by the subscriber when the call is made to a telephone number for which an identifier is stored in a file associated with that subscriber.

This arrangement enables a subscriber to identify very easily the persons or locations or offices to which he has made calls during a billing period.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram showing a services network arrangement providing telecommunications and other services to customers/subscribers;

Figure 2 shows very schematically a block diagram of billing apparatus at the billing centre shown in Figure 1;

Figure 3 shows as a block schematic diagram data stores of files of a database of the billing apparatus shown in Figure 2;

Figures 4 and 5 show examples of subscriber key and data files stored in subscriber key and data files stores of the database of the billing apparatus shown in Figure 2;

Figure 6 shows an example of a plan and billing configuration file;

Figure 7 shows an example of a bundles data file;

Figure 8 illustrates an example of a plan tariff file;

Figure 9 illustrates an example of a nominated names file;

Figure 10 shows a flow chart illustrating generation of billing information;

Figure 11 shows a flow chart illustrating processing of call/usage information received by the billing centre;

Figure 12 shows a flow chart illustrating calculation of call/usage costs;

Figure 13 shows a diagram illustrating call processing;

Figure 14 shows a flow chart illustrating calculation of charges;

Figure 15 shows a flow chart illustrating generation of a bill or invoice;

Figures 16a and 16b illustrate examples of a main and an itemised bill, respectively;

Figures 17 to 19 illustrate different bundles data files;

Figure 20 illustrates another plan and billing configuration file;

Figure 21 illustrates another plan tariff file;

Figure 22 illustrates a master bundles data file;

Figure 23 shows a flow chart illustrating the generation of a combined bill;

Figures 24a and 24b illustrate respectively a main and an itemised combined bill;

Figure 25 illustrates a main bill incorporating utility charges;

Figure 26 illustrates a modification to the flow chart of Figure 15 or 23; and

Figure 27 illustrates an itemised bill produced using the modified process illustrated in Figure 26.

Referring now to Figure 1, there is shown a services network arrangement 1 which comprises a first mobile telecommunications network 2, a second mobile telecommunications network 3, a fixed telecommunications network 4 and a utility network, for example a gas or electricity supply network, 5.

Each of the mobile telecommunications networks 2 and 3 is, in this example, a GSM (Global System Mobile) digital cellular communications network the details of which are known and will not be described in detail here.

Each of the mobile telecommunications networks 2 and 3 consists, in this example, of a network provider 20, 30 which administers and controls the telecommunications network. The network provider 20, 30 is connected via communication links to a number (only one is shown for each network) of mobile switching centres 21, 31. Each mobile switching centre 21, 31 serves a geographical area and is coupled via communication links to a number of base station controllers 22, 32 (only two are shown for each network) which are distributed throughout the area served by the mobile switching centre 21, 31. Each base station controller 22, 32 is coupled via communication links to a number of base transceiver stations 23, 33 (only two are shown for each network). Each base transceiver station 23, 33 serves an area or cell of the network and is arranged to transmit radio signals to and receive radio signals from mobile telephones 24, 34 within its area or cell in accordance with the GSM digital network protocol.

Although not shown in Figure 1, each mobile switching centre 21, 31 is also coupled to other mobile switching centres in the same network and to mobile switching centres in other mobile telephone communications networks and to fixed telecommunications networks such as the telecommunications network 4 shown

in Figure 1 so as to enable communication between the various different networks.

The fixed telecommunications network 4 comprises a fixed network provider 40 such as, for example, British Telecom or Cable & Wireless, which has a plurality (only two are shown) of central switching stations 41 coupled to it via cable or optical links. Each central switching station is coupled, again by cable or optical links, to the fixed line telephones (herein called "fixed telephones" although the actual telephones may be coupled to the telephone line via a radio or other remote link which enables the telephone to be moved around within the building to which the telephone line connection is provided) T of subscribers within its area.

The services network 1 shown in Figure 1 also includes a utility network 5 which comprises a utility network provider 50 such as, for example, a provider of gas, water or electricity. In the interests of simplicity, the utility network provider 50 is shown in Figure 1 as being directly connected via supply lines to the end users 52. In practice, of course, the end users will be connected to the utility provider 51 via an appropriate network. For example, where the utility provided is electricity, then the end users will be connected to the utility provider via sub-stations and

the electricity grid while where the utility being supplied is gas or water, then the end users 52 will be connected to the utility provider via an appropriate network of pipes and possibly also sub-stations.

The manner in which each of the end users of the service being provided is connected to the appropriate network provider is conventional and will not be described in further detail here.

In the services network 1 shown in Figure 1, each of the network providers 20, 30, 40, 50 is connected via a communication link 100a to a service provider billing centre 100 to which information regarding the usage by an end user of a particular service/utility is provided by the network provider 20, 30, 40 or 50.

As will be described in detail below, the billing centre 100 takes the information provided by the service/utility provider 20, 30, 40, 50 and generates bills for the usage of the service/utility for supply to subscribers or customers 60 (only four are shown in Figure 1) who are responsible for payment for the usage of the service/utility by the end users. Bills/invoices may be sent directly to the customers 60 using the postal service as illustrated by the dashed lines in Figure 1. Alternatively, where the customer has arranged to pay by

direct debit, then the bills generated by the billing centre 100 will be forwarded to an existing conventional electronic funds transfer system (EFT) 200 which then enables the amount being billed to be debited automatically from the customer's bank account. Where such a direct debit system is used, invoices may be sent separately by the billing centre to the customer as indicated by the dashed line 101 in Fig. 1. Alternatively customers may also be billed directly by the billing centre as indicated in Fig. 1 by the dashed lines 102 for the customers 60'.

Figure 2 shows block schematically an example of the billing centre 100. In this example, the billing centre 100 comprises a computer system having a main processing unit 101 which may be based on a minicomputer MC, in this example a DEC Alpha system. The minicomputer is coupled to a database 102 which stores the information necessary to generate bills or invoices for individual customers.

The minicomputer MC is also coupled by, for example, a local or wide area network (LAN or WAN) to a number of terminals 103 which will generally be personal computers which enable operators at the billing centre to access information stored in the database and, where the user at a terminal has the appropriate authority and password,

to add or alter information stored in the database.

The minicomputer MC is also coupled to a printer or series of printers 104 for printing reports regarding operations of the billing centre and invoices for supply to customers where required. A communication system 105 enables communication with the network providers 20, 30, 40, 50 to allow the usage information for customers to be input to the billing centre. The communication system may be provided by, for example, a LAN, WAN, the internet, an intranet, a fixed line or a MODEM connection.

The minicomputer has a data input system with, for example, a keyboard KYBD, a pointing device such as a mouse MO and a disk drive such as a floppy disk or CD ROM drive DD which enables, for example, software to be installed or modified by supplying the modification on a removable disk D compatible with the disk drive DD.

The database 102 consists of a number of different data stores the main ones of which are illustrated schematically in Figure 3.

The data stores shown in Figure 3 consist of:

a subscriber key files store 110 which stores, for each subscriber, a respective different subscriber key

file SKF containing static, i.e. nominally unchanging, information for that subscriber;

a subscriber data files store 111 which stores, for each subscriber, a respective different subscriber data file SDF containing information regarding that subscriber's usage of the services to which he subscribes;

a master account files data store 112 storing master account files MAF each associating a subscriber ("subsidiary subscriber") with another subscriber (a "master subscriber") such as a parent or company responsible for payment for the subsidiary subscriber's usage of the services to which they subscribe;

a plan and billing configuration files data store 113 storing, for each plan, a respective file containing billing and service information so as to provide the framework for setting up the plan;

a bundles data files store 114 storing for each subscriber one or more files BDF giving the details of bundled or free usage available to that subscriber;

a plan tariff files data store 115 storing, for each service provider and each plan, a tariff data file containing tariff information to enable billing;

a raw calls files data store 116 for storing raw calls/usage data provided to the billing centre by the service providers 20, 30, 40 and 50 (generally there will be a number of raw calls files stores for each service

provider);

a bundle calls data files store 117 for storing, for each cycle in which bills are generated and for each billing period, the bundled usage for each subscriber; and

a costed calls files (CCF) data store 118 for storing details of the incoming call data which has been supplied by the service providers and costed by the billing centre with, generally, there being one file for each cycle per billing period for each service provider.

Figure 4 illustrates an example of the main components of a subscriber key file SKF. The subscriber key file contains, amongst other items, the following: the subscriber's account number with the billing centre; a primary mobile telephone number for the subscriber; the subscriber's name; the ESN (electronic serial number) or SIM (Subscriber Identity Module) number for the primary mobile; a network identifier identifying the network to which the primary mobile is connected; the subscriber's postcode; credit control details; and a plan identifier identifying the plan to which the subscriber is subscribing.

Figure 5 illustrates an example of the main components of a subscriber data file. The subscriber data file contains, amongst other items, the following:

the subscriber's account number; a master account number; information identifying the plan tariff for the subscriber; information identifying currently available services; the amount and date of the last bill and last payment; the contact name, full address and telephone contact numbers for the subscriber; direct debit information; bill type and cycle; and the current value of unbilled calls.

In this example, the subscriber is an individual subscribing to use of a single mobile telephone connected to one of the two mobile telephone networks 20 and 30 with which the billing centre is associated. Accordingly, in this case, the master account number is the same as the subscriber account number.

Figures 6, 7 and 8 show the plan and billing configuration, bundles data and plan tariff files, respectively, for the plan selected by the particular subscriber: in this case a "multiple bundles" plan.

The plan and billing configuration file shown in Figure 6 includes, amongst other features, the length, start and end of a billing cycle, the name of the network to which the subscriber subscribes, the tariff plan name and the network plan type which identifies the network's base tariff to which the subscriber is connected (the

plan need not correspond exactly to the network tariff), and the services selected by the subscriber. In this case, four possible services S1 to S4 are available. These services may be, for example, call waiting, callback, message taking facilities, itemised billing, local call saver option, international callers etc. For each of these services, the plan and billing configuration file gives the name, charge for the service when requested by the subscriber when he initially subscribes, the cost of adding the service later, the cost of removing the service, the network name and charge, if any, associated with the service, the cost per month of the service, the cost per part month of the service and an indication whether a tariff different from that nominally associated with the plan should be used if this particular service is in operation.

The plan and billing configuration file also includes details of applicable bundles giving the amount of bundled or free usage selected for the plan and a date field which gives the number of mobiles for which the bundle will be provided; for example a bundle for a given service may be available only for the first six months of a new subscription. Although not shown in Figure 6, services may also be available only for a limited number of months.

The plan and billing configuration file mainly provides the framework for the setup of the plan and provides information for the billing of services.

The bundles data file shown in Figure 7 contains the relevant account number, the amount of bundled or free usage available for each of a number of different types or categories of bundle, the amount of bundle already used and a limited offer countdown for each bundle type. The limited offer countdown field contains the number of months (copied from the plan and billing configuration file) for which the bundle is available. Of course, the date field of the plan and billing configuration file may indicate that the bundle is available for each month that the subscriber's subscription is valid for the item to which the bundle relates. Where there is a limited offer countdown then the number in the countdown field is decremented each time a bill is generated. Where the services have a 'life expectancy' then this is copied into the subscriber file and decremented each time a bill is generated. In the example shown in Figure 7, the bundled usage is calculated in call units.

The bundles data file also includes the date and time of the last call, the bill cycle applicable, the call cost total to date for the billing period, a tariff indicator indicating which plan tariff is to be used with

the plan and details of the services S1 to S4 selected by the subscriber together with the date on which these services start and end.

Figure 8 illustrates part of a plan tariff file. The plan tariff file contains a charge period table (charge rate) in which, in this example, every half-hour of each day of the week is assigned to one of a number of different charge types, charge types CT1 to CT4 in this example. In this example, the charge types are: peak, off-peak, international calls peak and weekends. Each charge type is associated with each one of a number of zones, four in this example, In the UK the zones may be: inside the M25 motorway, provincial (that is outside the M25), local (where the subscriber has for example a local call saver option giving a reduced rate for local calls plus possibly also additional bundle(s) of local or other calls) and a zone available for future allocation. For each charge type and zone there is a number, in this case 40, of "distance bands" DB which include, for example, PTSN (Public Switched Telephone Network), same network mobile, other network mobile, local, international band (1-n), premium rate and message deposit/retrieval. Each distance band is associated with an initial minimum call duration (MIN), a charging unit for this initial period (MIN UNIT), a charge per minute for this initial period (MIN MIN) a charging unit (CHAR

UNIT) after the initial period, a charge per minute (CHAR MIN) after the initial period, a maximum (MAX) chargeable call duration and a bundling indicator (BUN).

Bundled or free usage may be provided for any type of call category. Examples are any combination of the following categories: calls originating in an off-peak period; calls to designated numbers; calls to other telephones on the same network; calls to other telephones using telecommunication services provided by the service centre; calls to other telephones using telecommunication services provided by the service centre where the subscriber is responsible for paying for those calls; calls initiated in a peak period; international calls; calls between mobile telephones; and local calls.

In this example, the bundle types B1 to B4 are as follows:

1. "peak", that is calls made between certain hours of the day on certain days, for example between 9 am and 6 pm regardless of zone.
2. "Off-peak", that is calls made after 6 pm and before 9 pm regardless of zone.
3. "Local", that is calls made within a given area, for example, as noted above, calls between two fixed telephones on a common STD exchange or calls from a mobile to a fixed

telephone in the area where the mobile telephone initiating the call is located and possibly also calls between mobiles on the same network and/or in the same area, for example within the M25 motorway in the south east of the UK, regardless of the charging rate.

4. "Nominated", that is calls made to particular nominated telephone numbers. These nominated telephone numbers are identified in a nominated names file which may be a separate file or part of the bundle data file. A typical separate nominated names file is shown in Figure 9.

As can be seen from Figure 9, each nominated names file associates, for a given subscriber account number, the telephone number and name of the person or company responsible for that telephone with a mnemonic and an unused distance band code, for example DB40. The nominated names may be allocated to the same or different unused distance bands.

Although the call categories are generally identifiable as combinations of charge rate, zone and distance bands, it will be appreciated that the bundle categories may not coincide exactly with the various

combinations of charge rates, zones and distance bands and that some calls may fall within two or more bundle categories. Accordingly, although not shown, the data store also includes a bundles priority file which, for each possible combination of charge rate, zone and distance band for each bundle indicates the priority or order in which the bundled usage is to be used.

The manner in which calls are processed using this multiple bundles plan will now be described with reference to Figures 10 to 14.

Figure 10 shows a flow chart of the overall process. At a first step S1, a network sub-routine S1 is activated which enables data to be acquired from the relevant network (N1, 20 in this case) and converted into a format suitable for processing by the billing centre (100). This is generally done on a daily basis.

Once the daily call data has been acquired and converted, a charge sub-routine S2 is carried out to determine the actual charges which will be invoiced for each call in the call data acquired from the network. Steps S1 and S2 are repeated daily until a decision is taken at the billing centre at step S3 that the end of a billing period has arrived. At this time, the billing centre carries out a billing sub-routine S4 and supplies

either directly to the customer 60 or to the EFT 200 if the subscriber data file indicates that a direct debit mandate exists for the subscriber, an invoice of the charges incurred for the billing period. The billing centre then returns to step S1 and the process is repeated. To enable handling of a large number of transactions, different billing cycles with different start and end times can be used for different networks.

Figure 11 is a flow chart illustrating schematically the steps involved in acquiring call data from a network provider (network sub-routine S1).

Data about an individual call is recorded as a "toll ticket" by the relevant network provider. The network provider gathers a number of such toll tickets into a file which also contains header information including the total number and total value of the calls in the file to enable the accuracy of the information in the file to be checked.

The structure of the toll ticket will depend upon the particular network provider but will include at least the following information: the identity of the subscriber (including the mobile number); where the call was made to; the time and date of the call; the duration of the call; where the mobile phone was situated when the call

was made; the tariff class (for example whether the call was made to another mobile or to a fixed, for example British Telecom, telephone); and the wholesale cost charged by the network provider to the service provider.

The toll ticket files are acquired by the billing centre by the communication system 105 by being supplied to the billing centre 100 via, for example, a leased communications line or by being taken by the billing centre from a known location on the system of the network provider.

As illustrated in Figure 11, on a daily basis, the minicomputer 101 polls or reads (depending on whether the files are supplied to the billing centre or are held at the network provider) the toll ticket files at step S12 and then stores these in the raw calls data store.

The toll ticket files are then converted at step S13 into raw calls files with fields not required for call processing being discarded. The network sub-routine then determines at step S14 whether the totals contained in the received file headers agree to the sum of call data in the file. If not, mismatched files are rejected at step S15. The network sub-routine also checks at step S14 whether the header files are sequentially numbered to ensure that all of the appropriate toll ticket files

have been received.

If the network file data is complete and accurate, then the converted network files are copied into the raw calls files data store 116 (Fig. 3) for that network in the database 102.

The network sub-routine then sorts the call records stored in the call data file at step S14a and removes at step S16 any duplicates.

The originating mobile phone number is then matched against the data in a control data file which includes details of every valid phone number for every subscriber of the service provider administering the billing centre at step S17. Any invalid calls are rejected and a daily report of rejects is provided at step S15a. The daily report shows all calls for which the mobile phone number was not recognised as being the number of a subscriber of the service provider administering the billing centre and shows all rejected duplicate calls. This report enables investigations to be carried out by personnel at the billing centre 100 to determine whether the mobile number relates to another service provider or whether the billing centre needs to be updated for that number and the relevant subscriber identified.

The stored valid data is then supplied at step S19 to the charging sub-routine to calculate the retail value of the calls as will be described below with reference to Figure 12.

The charging sub-routine S2 first determines at step S20 the relevant subscriber key and data files by locating the subscriber files with the same mobile number as the raw call data file.

The charging sub-routine determines from the subscriber data file plan and services fields, the associated plan tariff file at step S22 and calls at step 23 a call calculation sub-routine to calculate the cost of the call using the raw calls data file and the identified plan tariff file.

Following step S23, the subscriber data file is updated so as to update the value of unbilled calls and the cost of the call is stored at step S28 in the relevant costed call file in the costed calls file data store 118 which is located using the network identifier from the subscriber data file and the date of the call from the raw calls data file.

Figure 13 illustrates diagrammatically the association of a raw calls file RCF with subscriber key

and data files SKF and SDF, the associated costed calls file CCF and, if it exists, a nominated names file NNF. As can be seen from Figure 13, the mobile number in the raw calls file RCF is used to identify the subscriber key and data files SKF and SDF and any nominated names file NNF associated with that subscriber while the date from the raw calls file and the network identifier (N) from the subscriber data file (SDF) are used to identify the associated costed calls file (CCF) in the costed calls file data store 118. The relevant bundles data file (BDF) (not shown in Fig. 13) is identified using the account number in the subscriber data file. The relevant plan tariff file (PTF) is identified from the plan identifier in the subscriber data file but may be altered if the plan and billing configuration file indicates that a different tariff should be used for one of the services active for that subscriber data file.

The distance band of the call is then determined at step S29a in Figure 14. Thus, as shown schematically in Figure 13, the relevant charge rate CT is identified from the date and time of the call in the raw calls file RCF. In this example, it is CT1. The appropriate zone is identified from the location of the call and possibly also the dialled digits in the raw calls file. The distance band is determined from the location of the call and the network charge band.

At this stage, the MC 101 also compares the dialled digits in the raw calls file with the telephone numbers stored in any nominated names file NNF associated with the subscriber and allocates the call instead to the nominated names distance band if a match is found.

The MC 101 then checks at step S29 whether the bundle indicator field of the plan tariff file indicates that the determined combination of charge rate, zone and distance band falls within a bundle category and, if so, determines from the bundles data file if there are bundle units remaining. If the answer at step S29 is yes, then the processor checks at step S30 whether more than one bundle category is applicable to the call as may be the case for, for example, a local call made at the weekend which may fall into an anytime, a weekend or a local bundle, for example.

If there is more than one possible bundle category, the minicomputer MC 101 checks the bundle priority file (not shown in Fig. 13) to select the highest priority bundle which has remaining capacity at step S31.

The MC 101 checks at step S32 whether the number of remaining bundle units is greater than the number of units. If the answer is yes, then the call units are deducted from the remaining bundle units at step S33.

If the answer is no, then the remaining bundle units are deducted from the call units, the available bundle units are set to zero in the bundles data file at step S35 and the charge for the remaining units of the call is determined using the determined charge rate, zone and distance band combination in the plan tariff file at step S36.

In this example, the bundle usage is determined in units. It may however also be determined by the time or cost (value) of the call. If the latter alternative is selected, then the charge for the call has to be calculated at the tariff rate at step S33 and then deducted from the remaining bundle value. Similarly, steps S35 and S36 need to be modified so that the charge for the call is determined at the determined tariff rate at step S35 and the remaining bundled value is then deducted from the call value and the actual charge for the call determined from the remaining value.

When the end of a billing period (which in this example is one month) has been reached, then the billing sub-routine is carried out as indicated at step S4 in Figure 10.

Figure 15 illustrates the billing sub-routine. Initially at step S37, the MPU 101 determines from the

relevant subscriber data file the unbilled call charges.

The MPU then determines any monthly charges from the associated plan and billing configuration file (Fig. 6) at step S38.

The MPU then checks at step S39 whether itemised billing is indicated in the bill type field of the subscriber data file. If the answer is yes, then the MC 101 retrieves at step S40 the details (that is the called number, duration and charge) for each unbilled call from the costed calls file store in the database 102 and prepares an itemised bill at step S41. Generally the itemised bill will be prepared as an attachment to the main bill which indicates the total charge and any monthly or other standing charges. This main bill is prepared at step S42 following step S41 or if the answer at step S39 is no.

The MC 101 then checks at step S43 whether the subscriber data file indicates that the subscriber is paying by direct debit. If the answer is yes, then an invoice is printed and sent to the subscriber indicating that the invoice is for information only (because the account is being paid by direct debit) at step S44 and then the necessary instructions are sent to EFT at step S45 to debit the subscriber's bank account. If the

answer at step S43 is no, then an invoice with instructions for payment is sent to the subscriber at step S46.

An example of a direct debit main bill is shown in Figure 16a while part of an itemised call bill is shown in Figure 16b. It will be appreciated that these are examples only and for simplicity and to avoid any implication that accurate charges are being given no monetary values are indicated; rather these are represented by random letter combinations.

Where bundles have a limited number of months availability then the countdown figure in the bundles data file is decremented each time a monthly bill is generated. The number of months remaining for any services which have a limited number of months availability is similarly decremented.

Generally, a months available bundle usage will expire at the end of the month with any remaining bundled usage being forfeit. However remaining unused bundled usage could be rolled over to the next months usage.

The "multiple bundles" plan described above with reference to Figures 7 to 15 thus enables a subscriber to have bundled or free call usage (units, time or value)

for a number of different call categories. The free usage for different categories may be determined in different ways, with the free usage in one category being determined by cost and the free usage in another category being determined by time for example.

The multiple bundles plan discussed above is intended for a single subscriber having a single mobile telephone for which telecommunications services are provided by the first network provider (NP1) 120. If, however, the subscriber is a master subscriber responsible for payment of the accounts for a number of subsidiary subscribers, then the master subscriber will have a subsidiary key file or record of the type shown in Figure 4 which contains the master account number as the account number and a dummy mobile number as the primary mobile number. The master subscriber will also have a subscriber data file as shown in Figure 5 in which the account number is the master account number and a bundles data file in which the account number is again the master account number.

In addition, the master subscriber will also have a number of master account files in the master account files store 112 each of which associates a respective different subsidiary subscriber account with the master account. Each subsidiary subscriber will have the same

files as an ordinary individual subscriber but will, in addition, have a record or file in the master account files store 112 linking it to the master account.

Such an arrangement enables each individual subsidiary subscriber to have their own individual allocated bundled call usage so that each subsidiary subscriber's allocation can be tailored to their specific needs. Also, each subsidiary subscriber may have different available services as defined in the bundles data file for that subsidiary subscriber enabling, for example, the master subscriber to determine that a given subsidiary subscriber shall not be allocated certain services or that certain types of call such as international calls are barred to that subsidiary subscriber.

Instead of each subsidiary subscriber being allocated their own bundled call usage, the subsidiary subscribers may share bundled usage with the master subscriber. This can be achieved simply by, in the units available, units used and countdown section for the bundles in the subsidiary subscriber's bundles data file, providing pointers to the master subscriber's bundle data file so that whenever a subsidiary subscriber makes a call which falls within one of the bundled category types, then that usage is deducted from the common

available bundled usage held by the master subscriber.

Any subscriber may subscribe to more than one service controlled by the billing centre. For example, a subscriber may have more than one mobile telephone number or may also subscribe to a fixed telephone service provider and/or a utility provider. In such a case, the subscriber will have a separate bundles data file for each mobile number, fixed telephone number and utility to which he subscribes with each bundles data file including, in addition to the account number, the mobile, fixed telephone or utility reference number and an associated identifier which identifies the service type, i.e. mobile, fixed or utility, of network. Figure 17 illustrates a bundles data file for a subscriber having an additional mobile number. This additional mobile number may or may not be on the same network as the primary mobile number. Figure 18 illustrates a bundles data file for a subscriber who also has a fixed telephone number. The bundled call usage and services available for the fixed telephone may be the same as or different from those available for a mobile number. Providing each telephone (whether it be fixed or a mobile telephone) with its own bundles data file enables each telephone to have different bundled usage and different services.

Figure 19 illustrates an example of a utility

bundles data file which includes instead of the telephone number the utility reference number used by the utility provided to identify the customer. Bundled usage may also be provided for a utility. Different categories of bundled usage may, again, be available. For example, where the utility is gas, then a number of free therms or units may be provided in off-peak or peak usage periods. Services available to the utility subscriber such as, for example, whether the subscriber has a maintenance contract for their central heating system may be held in the subscriber data file in the same way as a messaging service for a mobile telephone.

The plan and billing configuration files store 113 holds details of all available plans, services and associated bundles for all networks (fixed, mobile, utility) and is used to build and update the bundles data file to reflect plan charges and service additions/removals in the subscriber data file. Figure 20 shows part of a plan and billing configuration file for a plan allowing for mobile and fixed telephones and gas as a utility.

The plan tariff file associated with a subscriber subscribing to services provided in addition to the primary mobile will include, where appropriate, respective charge rates and zone tables for each service

provider. Generally, where there are two or more mobile telephones on the same network, then these will use the same charge rate and zone tables. The second network may use the same or different charge rate and zone tables. The fixed telephone service will generally use different charge rates and will have different distance bands. A utility may have only a single charge rate or may have, for example, two charge rates one for peak and the other for off-peak usage. Figure 21 illustrates part of a plan tariff file for use where a subscriber subscribes to both the first and second mobile networks, the fixed telephone network and a utility such as gas.

The process carried out by the minicomputer MC 1 to identify the relevant plan tariff file where the raw calls file is not for the primary mobile is somewhat different from that described above with reference to Figure 13. Thus, where the raw calls file is for a secondary mobile or fixed telephone, then the identifying telephone number in the raw calls file will not match any of the primary mobile numbers in the subscriber key and data file. When the MC 101 determines that this is the case, it then checks the bundles data files for the telephone number concerned and determines the relevant subscriber key and data file from the account number given in the appropriate bundles data file containing that telephone number. The process then proceeds

essentially as described above with reference to Figure 13 except that the network identifier given in the bundles data file rather than that given in the subscriber key and data files is used to determine the appropriate costed calls file data store.

A similar procedure is carried out where the raw data is for supply of a utility. Of course, the field of the raw data file for a utility will not be the same as those shown in Figure 13. For example, for a utility, the raw data file may simply provide the utility reference number, date, time, units used, period over which the units were used and the network cost.

Where the additional service is a mobile or fixed telephone number then the required distance band can be determined in the same manner as described above with reference to Figure 13. Where the additional service is supplied is a utility, then the date and time or period of usage and network costs in the raw data file will be used to determine the appropriate charge rate. In other respects, processing of raw data proceeds as described above with reference to Figures 7 to 16.

In the arrangements described above, each separate telephone/utility has its own separate bundled usage. However, another of the available plans allows for usage

to be shared across networks. This is achieved by use of the master subscriber arrangement. Thus, a subscriber wishing to share bundled usage across networks will have a master subscriber key and data files giving the master account number and a dummy mobile number and a master bundles data file as illustrated in Figure 22 for that dummy mobile number. The master subscriber will then have a separate bundles data file for each additional telephone and the "units available", "units used" and "countdown" fields for the available bundles in each of those bundles data files will, instead of giving details about the bundles, include a pointer to the dummy mobile bundles data file in the master bundles data file which gives the total bundled units available and used and the countdown for each of the bundled categories shared between the telephones for which that particular subscriber is responsible. Of course, not all of the telephones for which that subscriber is responsible need share the bundles. Some of them may have their own independent bundles. Generally, bundled usage for a utility will not be shared across networks. However, bundled usage for a utility may be shared on the same network between different subsidiary subscribers by providing the master subscriber with a master utility bundles data file giving a dummy utility reference. Of course, the subscribers sharing the bundles can be on the same or different networks.

Generally, a single combined bill or invoice will be prepared for each provided service for each master or individual subscriber. Figure 23 illustrates the billing procedure when this is the case.

Thus, at step S50, the MC 101 first determines whether an itemised bill is required. If the answer is no, then the MC 101 determines the unbilled calls (usage) from the bundles data files at step S51, then determines any monthly/standing charge from the plan and billing configuration file at step S52 and assembles the charge details for that subscriber at step S53. The MC 101 then checks at step S54 whether the calls/usage for another subscriber have to be billed and if the answer is yes the MC 101 repeats steps S51 to S53.

If the answer at step S50 is yes, an itemised bill is required, then the MC 101 determines at step S56 the unbilled calls/usage from the subscriber data file, then determines at step S57 the monthly/standing charge for that subscriber, retrieves the costed calls/usage data for that subscriber from the costed calls/usage files store 118 in the database 102 at step S58 and assembles the individual call details for that particular subscriber at step S59. The MC 101 then checks at step S60 whether the call details for another subscriber have to be assembled and if the answer is yes proceeds to

repeat steps S56 to S59.

When the answer at either step S54 or step S60 is no, the MC 101 checks whether the subscriber subscribes to services on another network at step S54a or S60a and, if so, repeats steps S51 to S54 or S56 to S59 as appropriate for that network. When the answer at step S54a or S60a is no, then the MC 101 assembles a main bill listing the monthly charge and total call cost for each telephone/utility for each network and an itemised bill listing the individual call charges for each telephone.

The billing information is then despatched in the same manner as described above with reference to Figure 15 (that is steps S43 to S46 are carried out).

Figure 24a illustrates an example of a main bill generated for a subscriber with multiple mobile telephones on different networks and Figure 24b illustrates the accompanying itemised bill.

Fig. 25 illustrates a main bill where a utility is also included. The itemised bill will be similar to that shown in Figure 24b.

As discussed above, a subscriber may have an associated nominated names file which identifies one or

more telephone numbers with the name of the person or company who usually answers or is responsible for that telephone and a mnemonic identifying the telephone number to the subscriber. As described above, this enables bundled usage to be allocated to one or more or shared between these nominated names. In addition, the bill type given in the subscriber data file may also indicate that called party identified billing is required. This may be provided in addition to or separately from bundled usage for nominated names but can only be provided where the subscriber has an associated nominated names file. Where a subscriber has requested called party identifying billing, then the billing process is carried out as described above for itemised billing with the exception that step S58 in Figure 23 is supplemented as shown in Figure 26 so that, after step S40 in Figure 15 or S58 in Figure 23 at which the cost of the call data has been retrieved, the MC 101 checks the subscriber file at step S90 to see if any of the called numbers correspond to any of the numbers in the nominated names files and, if so, substitutes or supplements the relevant telephone number with the nominated name or mnemonic at step S91 prior to proceeding to step S59.

Figure 27 shows part of the itemised call section of a bill where the call information for identified/nominated names gives both the telephone

number called and the mnemonic or name requested by the subscriber as a double-check for the subscriber. Alternatively, the itemised bill may omit the called telephone number and give only the nominated name or mnemonic.

It will of course be appreciated that the various data fields of the files in the files stores 110 to 118 will contain information in the form of appropriate words and/or numbers and will not in practice be blank. Thus fields have simply been left blank for ease of understanding and because what is relevant is the structure of the files not the information contained therein.

It will, of course, be appreciated that the charge rates, zones and distance bands given above are given by way of example only and that different ones could be used and that the periods covered by the charge rates could be different. In addition, bundled usage for different categories of calls/usage other than those mentioned above may be provided.

The bundles data file arrangement described above enables a high degree of flexibility. Thus, if a subscriber wishes to change his subscription by adding or deleting mobile or fixed telephones or utilities, then

it is simply necessary to add the appropriate bundles data files. Similarly the charges to the subscriber can be adjusted simply by altering the plan tariff file.

Also, although in each of the embodiments described above a subscriber is required to have a mobile telephone, this need not necessarily be the case. Thus, the primary mobile may be replaced by a primary fixed telephone number or a primary utility reference number where that particular service is of prime concern to the subscriber.

The arrangement described above with reference to Figure 23 may be modified by providing a field in the, for example, subscriber data file which indicates that combined billing for all the telephones and/or utilities for which the subscriber is responsible is not required. In such circumstances the billing centre will produce separate individual bills for each telephone/utility by, instead of combining the details at step S55, causing them to be split into separate files dependent upon the actual telephone or utility reference member. Of course, as an alternative, a subscriber may have a number of independent accounts, for example one for each telephone or utility for which he is responsible. Also, a master subscriber may be provided with a combined bill and individual statements prepared for each subsidiary

subscriber so that the master subscriber can advise the subsidiary subscribers individually of the charges they have incurred.

In addition, although the above-described embodiments refer to only one utility, the system could be expanded to two or more different utilities and to provide for plans which allow for combined billing of the different utilities either alone or in combination with telecommunications services and also for the possibility of shared bundling of free units between the utilities, for example.

The embodiments described above presume that the bundled usage will be free. As an alternative, at least some of the bundled time may be reduced rate or specifically pre-paid for usage especially where, for example, the bundled usage relates to international or other expensive telephone calls.

Although the embodiments described above suggest that the service provider is a separate entity from the telecommunications network provider, this need not necessarily be the case and the service provider and the billing centre administered by the service provider may be directly under the control or part of one of the network providers.

CLAIMS

1. Apparatus for generating billing data for subscribers of a service centre providing services on number of different telephone networks, comprising:

data storage means storing allocated usage for at least one category of call for a subscriber and the telephone networks for which the allocated usage is applicable;

means for receiving data for each call made using the telecommunications services provided by the service centre;

means for identifying from the received data the subscriber responsible for paying for the call and the associated telephone network; and

data processing means for determining from the received data the cost to the subscriber of the call, which data processing means comprises

means for identifying from the received data whether the call falls within an allocated usage category associated with the subscriber responsible for paying for the call,

first call costing means for calculating the cost of a call in accordance with a tariff associated with the

call when the call does not fall within an allocated usage category associated with the identified subscriber, and

second call costing means for calculating the cost of a call when said category identifying means identifies that the call falls within an allocated usage category associated with the identified subscriber regardless of which of the telephone networks for which the allocated usage is applicable was used to make the call, said second call costing means comprising means for comparing the call usage with the remaining allocated usage, means for deducting the call usage from said remaining allocated usage when said remaining allocated usage is greater than said call usage, means for setting the difference between said remaining allocated usage and said call usage as an excess call usage and the remaining allocated usage to zero when said call usage is greater than said remaining allocated usage and means for calculating the cost of said excess call usage using said tariff when said call usage exceeds said remaining allocated usage.

2. Apparatus according to claim 1, wherein the second call costing means is arranged to determine that any call

usage falling within the allocated usage is free of charge.

3. Apparatus according to claim 1 or 2, wherein the data storage means stores different allocated usage for different categories of call for a subscriber.

4. Apparatus according to claim 1, 2 or 3, wherein the data storage means stores different categories of allocated usage for different subscribers.

5. Apparatus according to any one of claims 1 to 4, wherein the different categories of call comprise any combination of the following categories: calls originating in an off-peak period; calls to designated numbers; calls to other telephones on the same network; calls to other telephones using telecommunication services provided by the service centre; calls to other telephones using telecommunication services provided by the service centre where the subscriber is responsible for paying for those calls; calls initiated in a peak period; international call; calls between mobile telephones; and local calls.

6. Apparatus according to any one of claims 1 to 5, wherein the first and second call costing means are arranged to use a tariff which is determined by the type of the call, for example the time at which the call is made and/or the location of the originator or receiver of the call.

7. Apparatus according to any one of claims 1 to 6, wherein the data storage means stores for a subscriber a nominated telephone number or numbers and the first and second call costing means are arranged to use a different tariff for the nominated number or numbers.

8. Apparatus according to any one of claims 1 to 7, wherein the apparatus further comprises:

means for collating billing information for the usage within a billing period of each network to which a subscriber subscribes; and

invoice generating means for generating at the end of a billing period a single invoice giving the billing information for all or some of the service networks to which a subscriber subscribes when the combined bill determining means determines that the subscriber requires such a combined bill.

9. Apparatus according to any one of claims 1 to 8, wherein the data storage means has one or more files each associated with a different subscriber and each containing one or more telephone numbers and a respective different identifier associated with each telephone number and chosen by the subscriber; and the apparatus further comprises

means for identifying from the received data whether the call was made to a telephone number stored in such a file associated with the subscriber and, if so, for determining from that file the identifier associated with that telephone number; and

means for generating for the subscriber a document which associates the call with the identifier chosen by the subscriber when the call is made to a telephone number for which an identifier is stored in a file associated with that subscriber.

10. Apparatus for generating billing data for subscribers of a service centre providing services on a plurality of different networks, comprising:

data storage means storing for each subscriber details of the network or networks for which the subscriber has a subscription;

means for receiving data for each use made of the services provided by the service centre;

means for identifying from the received data the subscriber responsible for paying for the use;

means for determining and storing for each subscriber billing information for network usage for which that subscriber is responsible;

means for collating billing information for the usage within a billing period of each network to which a subscriber subscribes; and

invoice generating means for generating at the end of a billing period a single invoice giving the billing information for all or some of the networks to which a subscriber subscribes.

11. Apparatus according to claim 10, wherein the data storage means has one or more files each associated with a different subscriber and each containing one or more telephone numbers and a respective different identifer associated with each telephone number and chosen by the subscriber; and the apparatus further comprises

means for identifying from the received data whether the call was made to a telephone number stored in such a file associated with the subscriber and, if so, for

determining from that file the identifier associated with that telephone number; and

means for generating for the subscriber a document which associates the call with the identifier chosen by the subscriber when the call is made to a telephone number for which an identifier is stored in the file associated with that subscriber.

12. Apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

data storage means having one or more files each associated with a different subscriber and each containing one or more telephone numbers and a respective different identifer associated with each telephone number and chosen by the subscriber;

means for receiving data for each call made using the telecommunications services provided by the service centre;

means for identifying from the received data the subscriber responsible for paying for the call;

means for identifying from the received data whether the call was made to a telephone number stored in such a

file associated with the subscriber and, if so, for determining from that file the identifier associated with that telephone number;

data processing means for calculating the cost of a call; and

means for generating for the subscriber a document which associates the call with the identifier chosen by the subscriber when the call is made to a telephone number for which an identifier is stored in a file associated with that subscriber.

13. Apparatus according to claims 10, 11 or 12, wherein the data storage means stores allocated usage for calls of a given category of call for a subscriber; and the apparatus further comprises

means for identifying from the received data whether the call falls within such a usage category associated with the subscriber responsible for paying for the call,

first call costing means for calculating the cost of a call in accordance with a tariff associated with the call when the call does not fall within the usage category associated with the identified subscriber, and

second call costing means for calculating the cost of a call when said category identifying means identifies

that the call falls within the usage category associated with the identified subscriber, said second call costing means comprising means for comparing the call usage with the remaining allocated usage for the category, means for deducting the call usage from said remaining allocated usage when said remaining allocated usage is greater than said call usage, means for setting the difference between said remaining allocated usage and said call usage as an excess call usage and the remaining allocated usage to zero when said call usage is greater than said remaining allocated usage and means for calculating the cost of said excess call usage using said tariff when said call usage exceeds said remaining allocated usage.

14. Apparatus according to claim 13, wherein the second call costing means is arranged to determine that any call usage falling within the allocated usage is free of charge.

15. Apparatus according to claim 13 or 14, wherein the data storage means stores different categories of allocated usage for different subscribers.

16. Apparatus according to any one of claims 13 to 15,

wherein the category of call comprises any one of the following categories: calls originating in an off-peak period; calls to designated numbers; calls to other telephones on the same network; calls to other telephones using telecommunication services provided by the service centre; calls to other telephones using telecommunication services provided by the service centre where the subscriber is responsible for paying for those calls; calls initiated in a peak period; international call; calls between mobile telephones; and local calls.

17. Apparatus according to any one of claims 13 to 16, wherein the first and second call costing means are arranged to use a tariff which is determined by the type of the call, for example the time at which the call is made and/or the location of the originator or receiver of the call.

18. Apparatus according to any one of claims 13 to 17, wherein the data storage means stores for a subscriber a nominated telephone number or numbers and the first and second call costing means are arranged to use a different tariff for the nominated number or numbers.

19. Apparatus according to any one of claims 13 to 18, wherein, when a subscriber subscribes on a plurality of different telecommunications networks, the identifying means and second call costing means are arranged to assign a call to an allocated usage for the category of the call regardless of the network on which the call was made.

20. Apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

data storage means storing for a subscriber allocated usage for calls of each of a plurality of different categories of call; and

data processing means for relating said allocated usage to calls made during a billing period in order to generate billing data for the subscriber.

21. Apparatus for generating billing data for subscribers of a service centre providing services on number of different telephone networks, comprising:

data storage means storing allocated usage for at least one category of call for a subscriber and the

telephone networks for which the allocated usage is applicable; and

data processing means for relating said allocated usage to calls made during a billing period, regardless of which of the networks to which the subscriber subscribes was used to make the call, in order to generate billing data for the subscriber.

22. Apparatus for generating billing data for subscribers of a service centre providing services on a plurality of different networks, comprising:

data storage means storing for each subscriber details of the network or networks for which the subscriber has a subscription; and

data processing means for generating at the end of a billing period a single invoice giving the billing information for all or some of the networks to which a subscriber subscribes.

23. Apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

data storage means having one or more files each

associated with a different subscriber and each containing one or more telephone numbers and a respective different identifier associated with each telephone number and chosen by the subscriber; and

processing means for generating for the subscriber a document which associates a call with the identifier chosen by the subscriber when the call is made to a telephone number for which an identifier is stored in a file associated with that subscriber.

24. Apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

data storage means storing for a subscriber allocated usage for calls of each of a plurality of different categories of call;

means for receiving data for calls made using the telecommunications services provided by the service centre;

means for identifying from the received data the subscriber responsible for paying for the call; and

data processing means for determining from the received data the cost to the identified subscriber of

the call, which data processing means comprises

means for identifying from the received data whether the call falls within one of a plurality of predetermined different usage categories associated with the identified subscriber,

first call costing means for calculating the cost of a call in accordance with a tariff associated with the call when the call does not fall within one of the plurality of different categories associated with the identified subscriber, and

second call costing means for calculating the cost of a call when said category identifying means identifies that the call falls within one of the plurality of different usage categories associated with the identified subscriber, said second call costing means comprising means for comparing the call usage with the remaining allocated usage for the identified category, means for deducting the call usage from said remaining allocated usage when said remaining allocated usage is greater than the call usage, means for setting the difference between the remaining allocated usage and said call usage as an excess call usage and the remaining allocated usage to zero when said call usage is greater than said remaining allocated usage, and means for calculating the cost of

said excess call usage using said tariff when said call usage exceeds said remaining allocated usage.

25. Apparatus for generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

data storage means storing allocated usage for calls of each of a plurality of different categories of call for a subscriber;

means for receiving data for calls made using the telecommunications services provided by the service centre;

means for identifying from the received data the subscriber responsible for paying for the call; and

data processing means for determining from the received data the cost to the subscriber of the call, which data processing means comprises

means for identifying from the received data whether the call falls within one of a plurality of predetermined different usage categories associated with the identified subscriber responsible for paying for the call,

means for allocating a priority to the different usage categories,

means for selecting the higher or highest priority one of said categories as the identified category when a call falls into two or more of the categories,

first call costing means for calculating the cost of a call in accordance with a tariff associated with the call when the call does not fall within one of a plurality of different categories associated with the identified subscriber, and

second call costing means for calculating the cost of a call when said category identifying means identifies that the call falls within one of a plurality of different usage categories associated with the identified subscriber, said second call costing means comprising means for comparing the call usage with the remaining allocated usage for the identified category, means for deducting the call usage from said remaining allocated usage when said remaining allocated usage is greater than said call usage, means for setting the difference between said remaining allocated usage and said call usage as an excess call usage and the remaining allocated usage to zero when said call usage is greater than said remaining allocated usage, and means for calculating the cost of said excess call usage using said tariff when said call usage exceeds said remaining allocated usage.

26. Apparatus according to claim 24 or 25, wherein the second call costing means is arranged to determine that any call usage falling within the allocated usage is free of charge.

27. Apparatus according to claim 24, 25 or 26, wherein the data storage means stores different allocated usages for different categories of call for a subscriber.

28. Apparatus according to claim 24, 25, 26 or 27, wherein the data storage means stores different categories of allocated usage for different subscribers.

29. Apparatus according to any one of claims 24 to 28, wherein the plurality of different categories of call comprise any combination of the following categories: calls originating in an off-peak period; calls to designated numbers; calls to other telephones on the same network; calls to other telephones using telecommunication services provided by the service centre; calls to other telephones using telecommunication services provided by the service centre where the subscriber is responsible for paying for those calls; calls initiated in a peak period; international calls;

calls between mobile telephones; and local calls.

30. Apparatus according to any one of claims 24 to 29, wherein the first and second call costing means are arranged to use a tariff which is determined by the type of the call, for example the time at which the call is made and/or the location of the originator or receiver of the call.

31. Apparatus according to any one of claims 24 to 30, wherein the data storage means stores for a subscriber a nominated telephone number or numbers and the first and second call costing means are arranged to use a different tariff for the nominated number or numbers.

32. Apparatus according to any one of claims 24 to 31 for generating billing data for subscribers of a service centre capable of providing a number of different services for the subscribers.

33. Apparatus according to claim 31 for generating billing data for subscribers of a service centre providing a number of different telecommunication services (mobile and/or fixed) to the subscribers.

34. Apparatus according to any one of claims 24 to 33 for generating billing data for subscribers of a service centre providing a number of different telecommunication services (mobile and/or fixed) and/or utility services (such as, for example administration of payment for gas, water or electricity supply).

35. Apparatus according to claim 32, 33 or 34, wherein, when a subscriber subscribes on a plurality of different telecommunications networks, the identifying means and second call costing means are arranged to assign a call to an allocated usage for that category of call regardless of the network on which the call was made.

36. Apparatus according to any one of claims 32 to 35, wherein the apparatus further comprises:

means for collating billing information for the usage within a billing period of each network to which a subscriber subscribes; and

invoice generating means for generating at the end of a billing period a single invoice giving the billing information for all or some of the service networks to which a subscriber subscribes when the combined bill determining means determines that the subscriber requires

such a combined bill and for generating separate bills for each network to which the subscriber subscribes when the combined bill determining means determines that the subscriber does not require a combined bill.

37. Apparatus according to any one of claims 24 to 36, wherein the data storage means has one or more files each associated with a different subscriber and each containing one or more telephone numbers and a respective different identifier associated with each telephone number and chosen by the subscriber; and the apparatus further comprises

means for identifying from the received data whether the call was made to a telephone number stored in such a file associated with the subscriber and, if so, for determining from that file the identifier associated with that telephone number; and

means for generating for the subscriber a document which associates the call with the identifier chosen by the subscriber when the call is made to a telephone number for which an identifier is stored in a file associated with that subscriber.

38. Apparatus for generating billing data for

subscribers of a service centre substantially as hereinbefore described with reference to the accompanying drawings.

39. A method of generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

storing for a subscriber allocated usage for calls of each of a plurality of different categories of call in data storage means; and

relating said allocated usage to calls made during a billing period in order to generate billing data for the subscriber.

40. A method of generating billing data for subscribers of a service centre providing telecommunications services to the subscribers, comprising:

storing for each subscriber allocated usage for calls of each of a plurality of different categories of call in data storage means;

receiving data for each call made using the telecommunications services provided by the service centre;

identifying from the received data the subscriber

responsible for paying for the call; and

determining from the received data the cost to the subscriber of the call by identifying from the received data whether the call falls within one of a plurality of predetermined different usage categories associated with the identified subscriber, calculating the cost of the call in accordance with a tariff associated with the call when the call does not fall within one of a plurality of different categories associated with the identified subscriber; and

calculating the cost of a call when said category identifying means identifies that the call falls within one of a plurality of different usage categories associated with the identified subscriber by comparing the call usage with the remaining allocated usage for the identified category, deducting the call usage from the remaining allocated usage when said remaining allocated usage is greater than the call usage, setting the difference between said remaining allocated usage and said call usage as an excess call usage and the remaining allocated usage to zero when said call usage is greater than said remaining allocated usage and calculating the cost of said excess call usage using said tariff when said call usage exceeds said remaining allocated usage.

41. A method of generating billing data for subscribers of a service centre providing services on a number of different telephone networks, comprising:

storing allocated usage for at least one category of call for a subscriber and the telephone networks for which the allocated usage is applicable in data storage means; and

relating said allocated usage to calls made during a billing period, regardless of which of the networks to which the subscriber subscribes was used to make the call in order to generate billing data for the subscriber.

42. A method of generating billing data for subscribers of a service centre providing services on a plurality of different networks, comprising:

storing for each subscriber details of the network or networks for which the subscriber has a subscription; and

generating at the end of a billing period a single invoice giving the billing information for all or some of the networks to which a subscriber subscribes.

43. A method of generating billing data for subscribers of a service centre providing telecommunications services

to the subscribers, comprising:

storing one or more files each associated with a different subscriber and each containing one or more telephone numbers and a respective different identifier associated with each telephone number and chosen by the subscriber in data storage means; and

generating for the subscriber a document which associates a call with the identifier chosen by the subscriber when the call is made to a telephone number for which an identifier is stored in a file associated with that subscriber.

44. A method of generating billing data for subscribers of a service centre substantially as hereinbefore described with reference to the accompanying drawings.

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): H4K (KEC , KED , KER , KEX); H4L (LDTT , LDPP)

Int Cl (Ed.6): H04M 15/00 , 17/00

Other: ONLINE: EPODOC, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	None	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.