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(21) International Application Number: PCT/FI97/00053 (22) International Filing Date: 31 January 1997 (31.01.97) (30) Priority Data: 960501 2 February 1996 (02.02.96) FI (71) Applicant (for all designated States except US): TELECOM FINLAND OY [FI/FI]; Sturenkatu 16, P.O. Box 106, FIN-00051 Tele (FI). (72) Inventors; and (75) Inventors/Applicants (for US only): ROMO, Jorma [FI/FI]; Telecom Finland Oy, P.O. Box 145, FIN-00051 Tele (FI). IKONEN, Jouni [FI/FI]; Telecom Finland Oy, P.O. Box 800, FIN-00051 Tele (FI). (74) Agent: LAHTI, Heikki; Telecom Finland Oy, P.O. Box 106, FIN-00051 Tele (FI).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <i>In English translation (filed in Finnish).</i>
(54) Title: METHOD AND SYSTEM FOR CHANGING A DIRECTION OF ESTABLISHING A TELECOMMUNICATION CONNECTION (57) Abstract The invention relates to a method for changing a direction of establishing a telecommunication connection in a telecommunication network, in which telecommunication connections are transmitted between the subscribers in different countries. In this method besides the telecommunication network it is used also a telecommunication connection (6), by which the connections in the desired direction are established and transmitted to the telecommunication network (7).		

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Method and system for changing a direction of establishing a telecommunication connection

The invention relates to telecommunication networks.

The invention relates particularly to a method and system for changing a direction of establishing a telecommunication connection in a telecommunication network in telecommunications between different countries.

The minute price for a call between two countries can significantly vary depending on from which country the call is made. This price difference is utilized by service operators offering so-called recall service, whose mode of operation is to change the call establishing direction so that the chargeable connection is established from the country offering cheaper connection time. These price differences between countries are often so great that calling to a third country through the recall service of another country is more advantageous than to call directly to this third country.

The recall service is effected nowadays generally as follows. The A-subscriber calls to the call number of the recall service and closes his phone without getting the answer for the call from the service system. Thereafter the service system checks the calling party's right of use for his data base and calls back to the A-subscriber who made the call. The service system asks the subscriber, to which foreign C-number he wants to call. After this the service system activates the connection to the called C-subscriber number and after receiving the answering signal connects the calling A- and called C-subscribers to each other. If either party closes, the call is ended and the service system breaks both connections. The called A-subscriber is charged for the connection times according to the service operator's own prices and not by the rates of the foreign operator in the calling A-subscriber's location country.

Concerning the service operator a non-desirable connection is formed in this realization model, when the service system establish a connection to the calling subscriber in order to ask the C-subscriber number. The service operator must pay account fees for the connection time beginning from this moment to the foreign operator of the A-subscriber. If the calling attempt is not finally successful, e.g. the called subscriber is busy, this non-desired connection has caused expenditures for the service operator without any profits.

Another alternative comprises that the service offerer can minimize the duration of the supplementary accountable connection by breaking the connection needed for the inquiry of the C-subscriber number immediately after receiving the necessary data for the C-subscriber. Then the service offerer calls again to the calling A-subscriber after the called C-subscriber has answered. A weakness in this solution is that by the coupling of the final connection a delay is caused, which depending on the case may last from seconds to a few dozen of them. Also here extra costs are caused for the service offerer, because the accountable connection to the third party has been established before the connection the customer wants is ready.

The object of the invention is to eliminate the drawbacks mentioned above. The particular object of the invention is to set forth a method and system when offering the recall service in countries, where calling abroad is substantially more expensive than calling from the service offerer's own country to the target country, so that by this method and system the service offerer is able to eliminate the formation of the extra connection time that only causes expenditures.

For the characteristic features of the invention reference is made to the claims.

The basic idea of the invention is that an accountable connection is established only after the called C-subscriber has answered the call, whereat the whole connection time can be utilized and the service operator can charge it from the calling A-subscriber. This is carried out according to the invention so that the desired call establishing direction and connections are formed from the public telenetwork by a separate telecommunication connection and after the connections have been established they will be coupled to the public telenetwork.

Thus by the method according to the invention no costs develop for the service operator offering the recall service in any stage of the call formation, which costs could not be charged from the call subscriber.

In the method according to the invention for changing a direction of establishing a telecommunication connection in a telecommunication network, in which telecommunication connections are made between subscribers in different countries, the A-subscriber introduces the telecommunication connection or makes a call to the service point or number of the service offerer to establish a telecommunication or call to a C-subscriber in another country and in which the establishing direction of the telecommunication connection is changed so that the telecommunication connection is formed first from the service offerer to the A-subscriber and further to the C-subscriber. According to the invention another telecommunication connection is established between the A-subscriber's home country and the country defined by the service offerer to establish connections in the desired direction between the A-subscriber, C-subscriber and the service offerer. This other telecommunication connection is preferably formed between the collection node and the service node operated by the service offerer. The service node is generally located where the service offerer operates or in a country that has advantageously priced foreign calls.

In one preferable embodiment the telecommunication connection introduced by the A-subscriber is connected to the collection node, and the C-subscriber's identification from the A-subscriber is received in the collection node. The identification of the A-subscriber and the C-subscriber is transmitted to the service node using another telecommunication connection between the nodes. A third telecommunication connection is established from the service node to the A-subscriber and a fourth telecommunication connection to the C-subscriber, and when the service node receives the answering signal from the C-subscriber, this is informed to the collection node and a connection is established between the A-subscriber and the C-subscriber. In the collection node the A-subscriber's data for the right of use is advantageously checked.

In one embodiment of the present invention the connection from the service node to the A-subscriber is kept in knocking state, until the fourth telecommunication connection between the service node and the C-subscriber has been established. The other telecommunication connection will also be broken, if the connection establishment from the service node to the C-subscriber fails.

The system according to the invention for changing a direction of establishing a telecommunication connection in a telecommunication network, in which telecommunication connections are established between the subscribers in different countries, includes a first terminal device for introducing the first telecommunications connection to the service providers service node in order to establish a telecommunication connection to the other terminal device in another country and in which system the establishing direction of the first telecommunication connection has been arranged as changeable so that the telecommunication connection is established first from the service provider to the first terminal device and further to the other terminal

device. According to the invention the system includes the collection node in the location country of the the first terminal device, which is connected to the public switched telephone network. Advantageously the service node and the collection node are either telenetwork exchanges equipped with special software or special features or separate systems connected by normal signalling or speech connections to the telecommunication network.

The invention will be described in the following in detail with reference to the enclosed drawing, in which a network model of the recall service according to the invention has schematically been presented.

The system according to the invention shown in the drawing consists beside the public telecommunication network of two separate node systems or the service node 5 and the collection node 4, a separate telecommunication connection 6 between the nodes and the service software to be adapted in the nodes. The public telecommunication network can be any combination of national or international telecommunication networks, in which it is possible to form telecommunication connections from any place to another place. Both the service node 5 and the collection node 4 are either telenetwork centers or exchanges equipped with special programs or features or separate systems connected by normal signalling or speech connections to the telenetwork. The service node 5 is situated in the service offerer's country M3 and the collection node in the target country M1, in which service is offered to customers and subscribers. The telecommunication connection between the nodes can include for instance a stationary coupled-in 64 kbit/s signalling connection.

The embodiment set forth in the drawing operates more precisely as follows. The customer who has made a deal with the service offerer or here the A-subscriber calls by the terminal device 1 the service call number, by which the call is

directed to the collection node 4 of the target country M1. The collection node 4 checks the usufructuary right data of the subscriber in its database and receives from the customer the actual target number to be called or the C-subscriber's number. The collection node 4 transmits the customer's identification, e.g. the subscriber's telephone number, and the target number along the telecommunication connection 6 between the nodes to the service node 5.

The service node 5 activates the connection establishing both to the called subscriber C and simultaneously to the collection node 4. Into the recall call to be transmitted to the collection node will be included the identification data of the calling subscriber that has previously been obtained from the concerned nodes along the telecommunication connection 6. Because the calling A-subscriber is "busy" in the teletechnical sense, the collection node 4 does not send the answering signal to the recall connection activated by the service node, but the recall remains in the so-called "knocking state" to wait the "release" of the A-subscriber. When the service node 5 receives the answering signal from the subscriber C, it informs this to the collection node 4 along the telecommunication connection 6 between the nodes. Thereafter the collection node 4 releases the A-subscriber and couples the knocked connection to the A-subscriber. The collection node transmits the answer signal to the telenetwork, whereat the speech connection between the calling A-subscriber and the called C-subscriber is established and the chargeable connection time begins.

If the time control for the waiting of the C-subscriber's answer is triggered (the called subscriber does not answer) or the C-subscriber is busy, the telecommunication connection process between the nodes, which has guided the calling attempt, will be broken off as also the knocking connection established through the public network according to the normal practices of the telenetwork.

The invention is not restricted to concern only the exemplary embodiments shown above, but many modifications are possible in the scope of the inventional concept defined in the accompanying claims.

CLAIMS

1. A method for changing a direction of establishing a telecommunication connection in a telecommunication network, in which telecommunication connections are established between the subscribers in different countries, in which method the A-subscriber introduces a telecommunication connection to the service offerer's service point in order to establish a telecommunication connection for a C-subscriber in another country, and in which method the establishing direction of the telecommunication connection is changed so that the telecommunication connection is established first from the service offerer to the A-subscriber and further to the C-subscriber, characterized in that another telecommunication connection is established between the location country of the A-subscriber and the country defined by the service offerer, and that another telecommunication connection is used in order to establish connections in the desired direction between the A-subscriber, C-subscriber and the service offerer.

2. A method according to claim 1, characterized in that another telecommunication connection is established between the collection node of the A-subscriber's location country and the service node in the country defined by the service offerer.

3. A method according to claim 2, characterized in that the telecommunication connection introduced by the A-subscriber is connected to the collection node; the identification of the C-subscriber is received in the collection node; the identification of the A-subscriber and the C-subscriber is transmitted to the service node by using another telecommunication connection; a third telecommunication connection is established from the service node to the A-subscriber and a fourth telecommunication connection to the C-subscriber; and when the service node receives the answer

signal of the C-subscriber, this is informed to the collection node; and a connection is established between the A-subscriber and the C-subscriber.

4. A method according to any of the preceding claims 1 - 3, characterized in that the usufructuary right data of the A-subscriber is checked in the collection node.

5. A method according to any of the preceding claims 1 - 4, characterized in that the connection established from the service node to the A-subscriber is kept in the knocking state, until the fourth telecommunication connection between the service node and the C-subscriber has been established.

6. A method according to any of the preceding claims 1 - 5, characterized in that the other telecommunication connection is broken off, if the connection establishing from the service node to the C-subscriber fails.

7. A system for changing a direction of establishing a telecommunication connection in a telecommunication network, in which telecommunication connections are established between the subscribers in different countries, to which system belongs a first terminal device (1) for introducing the first telecommunications connection (2) to the service point of the service offerer in order to establish a telecommunication connection to another terminal device (3) in another country, and in which method the establishing direction of the first telecommunication connection has been arranged as changeable so that the telecommunication connection is established first from the service offerer to the first terminal devices and further on to the other terminal device, characterized in that to this system belongs a collection node (4) in the location country of the first terminal device (1) being connected to the public telecommunication network (7); and a service node (5) in the country

defined by the service offerer, being connected to the public telecommunication network (7).

8. A system according to claim 7, characterized in that the service node (5) and the collection node (4) are either by a special program or special qualities equipped centers or exchanges of the public telecommunication network.

9. A system according to claim 7, characterized in that the service node (5) and the collection node (4) comprise separate systems connected by normal signalling and speech connections to the telecommunication network.

10. A system according to any of the claims 7 - 9, characterized in that this system is used in the direct telecommunication between two countries (M1, M2).

11. A system according to any of the claims 7 - 9, characterized in that the system is used in the telecommunication between two countries (M1, M2) through a third country (M3).

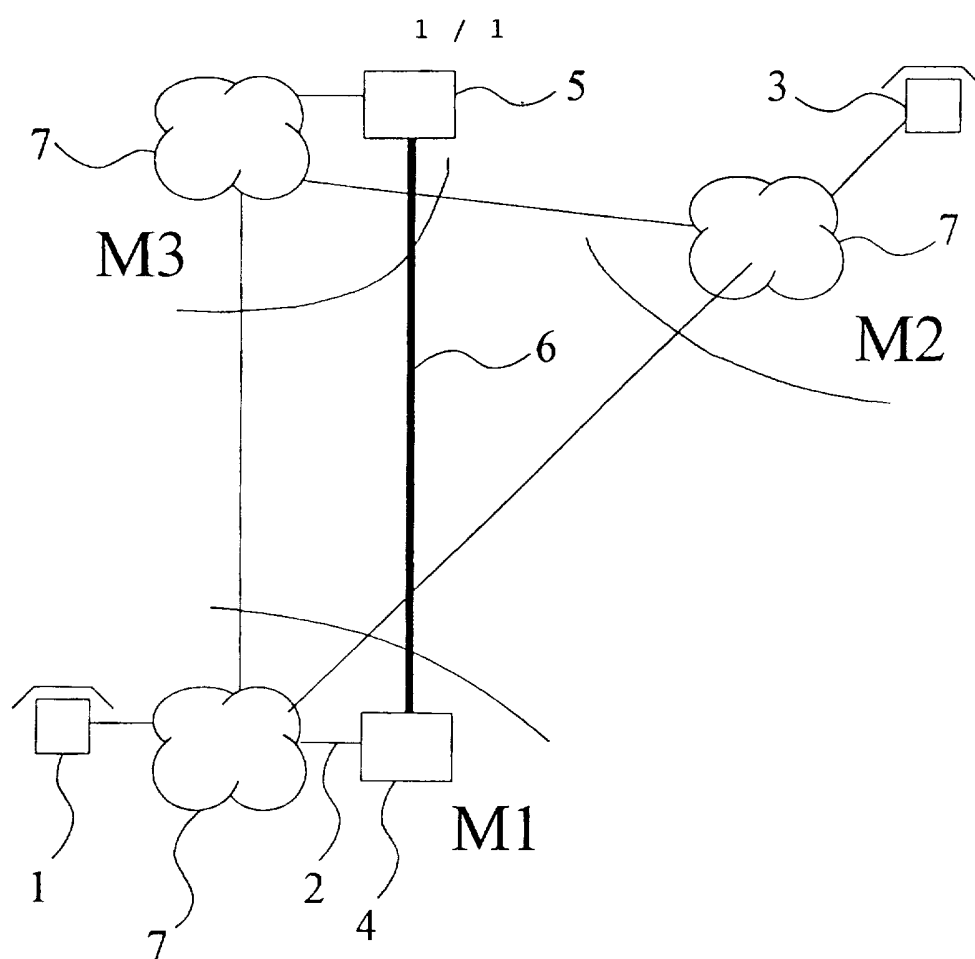


Fig 1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 97/00053

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 3/00, H04M 3/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9322866 A1 (PARAGON SERVICES INTERNATIONAL, INC.), 11 November 1993 (11.11.93), page 4, line 26 - page 10, line 30, figure 1 --	1-11
A	US 5473630 A (ARNO A. PENZIAS ET AL), 5 December 1995 (05.12.95), column 2, line 36 - column 5, line 21, figure 1 -- -----	1-11

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

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Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

Information on patent family members

01/07/97

International application No.

PCT/FI 97/00053

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
WO	9322866	A1	11/11/93	AU	4291893 A	29/11/93
US	5473630	A	05/12/95	AU	663635 B	12/10/95
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				BR	9400058 A	09/08/94
				CA	2113595 A	20/07/94
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