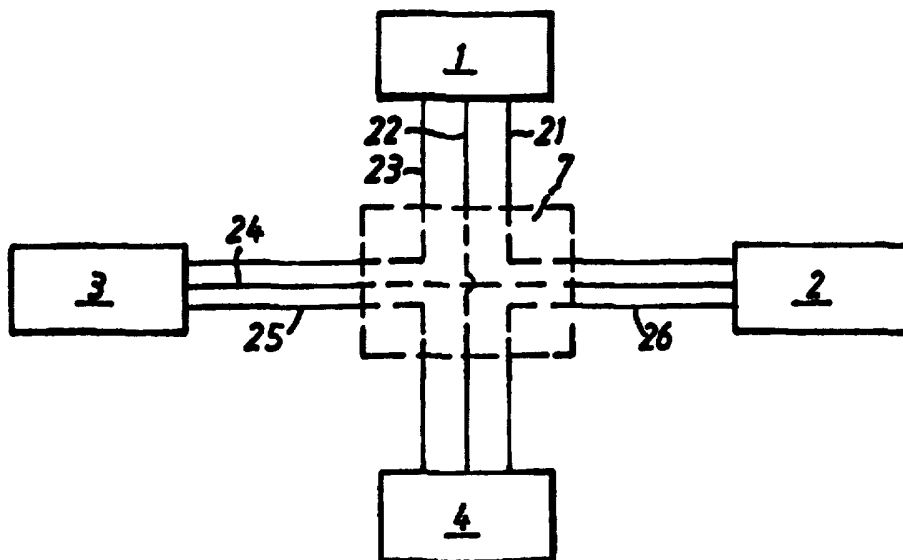




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(21) International Application Number: PCT/SE96/00058 (22) International Filing Date: 22 January 1996 (22.01.96) (30) Priority Data: 9500266-3 26 January 1995 (26.01.95) SE (71) Applicant (for all designated States except US): TELIA AB [SE/SE]; S-126 80 FARSTA (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): HAGSTRÖM, Bengt [SE/SE]; Vivelvägen 19, S-136 80 HANINGE (SE). (74) Agent: KARLSSON, Berne; Telia Research AB, Rudsjöterrassen 2, S-136 80 Haninge (SE).		(81) Designated States: US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.

(54) Title: TELECONFERENCE SYSTEM AT TELECOMMUNICATIONS SYSTEM, METHOD FOR ESTABLISHING OF TELECONFERENCE AND TELECONFERENCE EQUIPMENT FOR USE IN A TELECONFERENCE SYSTEM



(57) Abstract

The present invention relates to a conference system according to the figure. In the figure, conference equipments (1, 2, 3 and 4) are indicated as well as a public telephone network (7). Individual connections (21, 22, 23, 24, 25 and 26) are established between each of the conference participants. Connection is made in usual way over the public telephone network. The public telephone network can consist of a conventional public telecommunications network or telecommunications network which allows multimedia transmission. At the establishing of the conference, the initiating part informs the parts he/she addresses which other conference participants shall participate and which connections shall be established. Each of the participants is in this way given a possibility to utilize an individual equipment and to present conference information in one, for each participant, individual way.

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TITLE OF THE INVENTION

Teleconference system at telecommunications system,
method for establishing of teleconference and
5 teleconference equipment for use in a teleconference
system.

TECHNICAL FIELD

10

The present invention relates to a telecommunications
system where subscribers have possibility to establish
contact with each other via in the system arranged
connecting devices and connections. Especially does the
15 invention relate to a system where teleconferences can
be established in a flexible and for the subscriber
controllable way. The information which is transmitted
consists of multimedia information, i.e. speech, video,
data etc can be transmitted simultaneously between the
20 different participants.

PRIOR ART

25 Teleconference systems of different kinds are previously
known. The teleconference systems which are known and
used in the public telephone networks are characterized
by conferences being established via central equipments
in the telecommunications networks. The number of
30 conference participants is in this case restricted by
the capacity of the teleconference equipment; further
the number of possible conferences are restricted to the
number of conference equipments which the
telecommunications operator has installed in his
35 network.

In patent document US5003532 is indicated that it is previously known to arrange conference systems where individual connections are arranged between each of the conference equipments. In this case, however, is related
5 to establishing of fixed connections between the different conference equipments. In the patent document is presented an idea of arranging a central unit which attends to the connection of the different conference participants. The information transmitted in this case
10 relates to sound and picture.

In the patent document US4965819 is described a video conference system for example a room in court where it is not a matter of each participant having a control
15 unit.

In the patent document US4805205 is described establishing of communication between geographically separated persons. A number of stations maintain
20 communications between them. The stations st communicate with each other. Figure 1 shows a network comprising five stations arranged in a star configuration with a control station st3 connected to each other station. The connection of the conference
25 participants is in this case performed via central functions in the telecommunications network.

In patent document US4400724 is described a teleconference system with separate stations which are
30 connected to each other via six links. The connections are in this case permanently connected.

DESCRIPTION OF THE INVENTION
TECHNICAL PROBLEM

In future telecommunications networks conferences of
5 different kinds will to an ever greater extent be
desirable and established. The teleoperators' possibility
to measure future need and wishes is limited. To
establish permanent connections between different
possible conference participants is an impossibility.
10 The utilization of central conference equipments in the
telecommunications systems is further restricted to the
number of conference participants which respective
equipment can serve. Further such a system is dictated
by the teleoperator.
15 Possibilities for the conference participants themselves
to decide which formats that shall be used are wanted to
be considered to a greater extent. Further there is a
need at the different participants to individually be
able to receive different kinds of information from the
20 different participants. This can be exemplified by a
teleconference between a number of different
participants including that different kinds of
information is transmitted simultaneously. Each of the
participants shall at this have possibility to select
25 how the information is presented at each of the receiver
places. Further, each of the receivers shall have
possibility to exclude certain information which is not
relevant for the receiver place in question. At
teleconference transmission video, sound, data
30 information etc shall, accordingly, be transmitted
unimpededly.

The conference system shall further be possible to use
for multimedia information.

The system shall further be possible to use flexibly and not be dependent on the discretion of the teleoperator.

Further it is desirable that the teleoperator need not
5 provide expensive equipments in the telecommunications network. In telecommunications network which are established the costs for establishing of connections will be comparatively low, whereas equipments which are arranged in the network becomes comparatively expensive.
10 With future digital technology and utilization of for instance fibre optic connections the possibilities to arrange a large number of connections will increase radically in the telecommunications network.

15 The present invention takes these conditions as a starting point.

20 THE SOLUTION

The present invention relates to a teleconference system which is connected to a telecommunications system. The connection in the telecommunications system is
25 established by subscribers connected to the telecommunications network by indicating for instance call number. Call numbers can be given via key pads on for instance telephones. The transmitted information from the subscribers are received in the connecting
30 devices in the telecommunications network which establish connections via which the subscribers can communicate with each other. In this way a subscriber can establish a contact with just any subscriber in the telecommunications system. At least some of the
35 subscriber equipments in the telecommunications network are arranged as conference equipments. The conference

equipments are arranged to establish individual communication with every other conference equipment which is arranged to participate in a conference. Accordingly a number of individual connections are
5 established between a first conference equipment and each of the rest of the conference equipments which participates in the conference. In a corresponding way connections are established between the other conference equipments.

10

Each of the conference equipments in the teleconference system is further equipped with transmission - and reception devices for transmission respective reception of information from/to the other conference equipments.
15 Control devices in respective teleconference equipments further allow that an individual control of the conference can be achieved. It is consequently possible to present the information in different ways at each of the conference equipments independent of each other. The
20 information which is transmitted between the different conference equipments preferably consists of so called multimedia information.

The teleconference system accordingly allows video
25 conferences and audio conferences. The subscriber equipment includes editing equipment and combination equipment for editing and combination of received information from every other subscriber who participates in the teleconference. The editing equipment and the
30 combination equipment can be programmed by the user for presentation of conference information to the user in one of a number of formats.

In a further development of the invention the mentioned
35 editing device and combination device can be preprogrammed by the user to present conference

information in a format constructed by the users. The control device is further arranged to initiate or at command from the users connect connections to a number of subscribers and to transmit identification codes for mentioned selected subscribers to each of the mentioned subscribers. The control device is further arranged to appoint which of the mentioned number of subscribers who shall initiate communication links with other subscribers who participate in the conference equipment and to transmit identification codes to the subscribers as an individual subscriber must initiate in a communications link. The control device is further arranged to receive identification codes for the subscribers from a conference initiating equipment to establish connection to each of the selected subscribers and when connection has been established transmit connection signal to the mentioned initiated subscriber equipment.

Conference connection can for instance be established with the public telephone system or ISDN-network or broadband ISDN-networks etc.

The invention further relates to a teleconference equipment for use in a teleconference system. Reception devices for reception of data are arranged for simultaneous reception from a number of subscribers. Transmission devices for transmission of data to a number of subscribers, and control devices for communication with a number of other subscribers and established communication connections with a number of other subscribers are further arranged. The conference equipment is arranged to be in charge of video communication and/or audio communication. The teleconference equipment is further equipped with a combination equipment for editing and combination of data received from participating subscribers in a

teleconference. The editing device and the combination device can be programmed by the user to present conference information to the user in one out of a number of preprogrammed formats.

5

The editing equipment and the combination equipment can be preprogrammed to be used to present conference information to the user on format according to the user's own wishes. A control device is further arranged
10 to, at command of the user, initiate connection to one out of a number of subscribers and to transmit identification codes for mentioned selected subscribers to each of the selected subscribers. The control device is further arranged to appoint which of the mentioned
15 subscribers who shall initiate communication connections with other participating subscribers in a teleconference system and transmit identification codes to each of the subscribers and that respective subscriber individually initiates communication connection. The control devices
20 are further arranged to receive identification codes for the selected subscribers and establish connections to each of the mentioned subscribers. When the connections have been established connection signal is transmitted.

25 The invention further relates to a method for establishing of conference between a number of subscribers including the following steps

- a first subscriber establishes connection with each
30 of a number in advance selected subscribers and transmits to these an initiating signal identifying the participants, and
- at reception of mentioned conference initiating
35 signal each of the subscribers establishes a communication connection with the subscribers which

are identified in the mentioned conference identification signal.

Each of the subscribers decides the format on which the
5 conference shall be presented to him.

Establishing of connections between participants is made over a public telecommunications network where the subscriber can order automatic connection between just
10 any subscribers in the telecommunications network.

ADVANTAGES

15 Conference systems according to the present invention uses more connections than the known technology according to Figure 1. In Figure 2 a table is shown where the number of connections according to the conventional technology and the here suggested
20 technology is compared. The invention allows the participants in a teleconference to configure screens and control the conference in the way they want.

At transmission with large bandwidth such as optical
25 fibre a number of necessary connections can be established which are not critical cost parameters.

The provision of expensive and complicated control equipments in the telephone stations is however cost
30 critical. Distributed subscriber control is always cheaper and more flexible than a central control. A good analogy is to compare expensive central computers with PC-computers.

35 The present invention consequently has the advantage of being cheaper to arrange and operate than now used

system. The invention further allows that the user has a bigger freedom.

The invention accordingly allows that the subscriber can
5 acquire conference equipment which is adapted just for his/her own need.

DESCRIPTION OF FIGURES

10

Figure 1 shows a conventional teleconference system.

Figure 2 is a table which shows the number of necessary connections according to the conventional technology
15 respective according to the present invention.

Figure 3 shows a schematic construction according to the invention.

20 In Figure 4 is shown the schematic construction of a subscriber equipment.

DETAILED EMBODIMENT

25

In Figure 3 is shown a schematic presentation and the conference system according to the invention. In the illustrated example four participants 1, 2, 3 and 4 are arranged in a conference. A larger or smaller number of
30 participants can also be allowed. The conference is established by arranging communication connections 21-26 between each pair of participants according to the following.

35 Participant 1 to 2 communication link 21.

Participant 1 to 3 communication link 23.

Participant 1 to 4 communication link 22.

5 Participant 2 to 3 communication link 24.

Participant 2 to 4 communication link 26.

Participant 3 to 4 communication link 25.

10

The used subscriber equipment at each subscriber is shown schematically in Figure 4. Incoming data from each participant on the connections/channels 31 is received
15 by receiver 33 and outgoing information for other participants is transmitted on the connections/channels 32. The subscriber equipment is controlled by a control unit 36 which can be programmed via the user console 37. Incoming data from the receiver 33 is distributed in the
20 data- and signal control unit of the conference system and transmitted via the lines 40 and 44 to a mixer unit 34 and control unit 36. The mixer unit 34 combines signals which are received from the conference participants in a way which is decided by the control
25 unit 36. The formatted video signal passes the video display 38 over the connection 45. The camera by the microphone unit 39 transmits data for transmission to transmitter 50 via line 48. A conference system according to the present invention can provide
30 multimedia facilities. It can also be used together with telefax equipment, PCs and VCRs in a way that documentary information created i PCs and also on video tape can be shown during present conference.

35 The control unit 36 can be programmed to present each participant with incoming data which each transmits in

just any format independent of which formats other participants utilize. The shown format can be decided by the user or selected from a preprogrammed menu of formats. The video formatting is obtained by signal
5 processing performed by the combination units 34 and the editor 35.

Connections used between different participants are partly decided by the type of the conference, i.e. video
10 or audio and the wished picture quality at video conferences. The communication links can be physical links established over optical fibres, coaxial cables or at audio conferences ordinary physical connections. At
15 most communications media the connections are established via channels in the form of multiplex. Virtual links established over "bucket switch network" can also be used provided the delays are well controlled.

20 An important aspect for each conference system which operates over the telecommunications network is to process the use at established connections. The control unit 36, in the present invention, initiates the subscriber unit, the control unit and the conference
25 set. The control unit in the subscriber equipment 1, see Figure 3, transmits a signal to each of the other participants och informs them about the connections which shall be established. For instance the connections
30 21, 22 and 23 for connection towards subscriber 1 and initiates the control unit of the subscriber by transmitting a signal to subscriber 2 and instruct him/her to establish connections with subscriber 3 and 4
and a signal to subscriber 3 instructs him/her to establish a connection with subscriber 4. Subscriber 4
35 will have all connections established via other subscribers.

At establishing of a video conference the subscriber 1 according to Figure 3 calls the telecommunications system 7. The telecommunications system, which is a conventional telecommunications system with possibility to connect different subscribers, receives information on for instance connections 23. On this connection the subscriber 1 transfers the call number to subscriber 2. Connecting devices in the telecommunications system after that see to that call to for instance subscriber 3 is established. When the subscriber 3 answers the call the connection 23 is connected through between subscriber 1 and 3. Information is after that transmitted between subscriber 1 and 3 regarding the present establishing of the conference. The information which is transmitted is among other things information regarding which other participants who shall participate in the conference and a request that subscriber 3 establishes connection with other participants in the conference. In a corresponding way are after that communication links established between each of the conference equipments 1, 2, 3 and 4. When all connections have been established and the participants have configured their equipments according to their wishes and needs the conference starts. The presentation of the information which is transmitted between respective conference equipments can accordingly be individually configured. Further different kinds of information can be transmitted individually between individual conference equipments or to all conference equipments.

In the above mentioned description the conference system has been described from the starting point of a conventional public telecommunications network. The mentioned telecommunications network can of course

consist of different kinds of telephone networks such as
the ordinary telephone network, the data network or
other networks where connection of just any subscribers
is allowed in an automatic and by the subscriber
5 controlled way.

The invention is not restricted to the above presented
description or to the patent claims but can be subject
to modifications within the frame of the idea of
10 invention.

PATENT CLAIMS

1. Teleconference system at telecommunications system,
in which telecommunications system connecting devices
5 are arranged to establish communication between just any
subscriber equipments in the telecommunications network
where at least some of the subscriber equipments are
arranged as conference equipments,
c h a r a c t e r i z e d in that the conference
10 equipments are arranged to establish individual
communication between every other conference equipment
which is arranged to participate in a conference, and
that each of the conference equipments in the conference
system are arranged with transmission and reception
15 devices for transmission respective reception of
information to/from the other teleconference equipments.

2. Teleconference equipment according to patent claim 1,
c h a r a c t e r i z e d in that control devices are
20 arranged in each of the teleconference equipments for
individual control of the conference.

3. Teleconference equipment according to patent claim 1
or 2, c h a r a c t e r i z e d in that the transmission
25 of information refers to multimedia information.

4. Teleconference equipment according to patent claim 1,
c h a r a c t e r i z e d in that the conference system
is arranged for video conferences.

30

5. Teleconference equipment according to patent claim 1
or 4, c h a r a c t e r i z e d in that mentioned
conference system is arranged for audio conferences.

35

6. Telecommunications system according to patent claim
1, c h a r a c t e r i z e d in that mentioned
subscriber equipment includes editing equipment and
combination equipment for editing and combination of
5 received data from every other subscriber who
participate in the teleconference.

7. Teleconference system according to patent claim 6,
c h a r a c t e r i z e d in that mentioned editing
10 device and combination device can be programmed by the
user to present conference information to the user in
one out of a number of multiprogrammed formats.

8. Teleconference system according to patent claim 6 or
15 7, c h a r a c t e r i z e d in that mentioned editing
device and combination device can be preprogrammed by
the user to present conference information in a format
constructed by the users.

20 9. Teleconference system according to any of the
previous patent claims, c h a r a c t e r i z e d in
that mentioned control device is arranged to initiate or
at command from the user connect connections to a number
of subscribers and transmit identification codes for
25 mentioned selected subscribers to each of mentioned
subscribers.

10. Telecommunications system according to patent claim
9, c h a r a c t e r i z e d in that mentioned control
30 device is arranged to decide which of mentioned number
of subscribers shall initiate communications links with
other subscribers who participate in the teleconference
and transmit identification codes to the subscribers,
regarding communication links which an individual
35 subscriber must initiate.

11. Teleconference system according to any of the previous patent claims, c h a r a c t e r i z e d in that mentioned control device is arranged to receive identification codes for the subscribers from a
5 conference initiating equipment to establish connection to each of the selected subscribers and when connection has been established transmit a connection signal to mentioned initiating subscriber equipment.
- 10 12. A teleconference system according to any of the previous patent claims, c h a r a c t e r i z e d in that conference connection can be established with the public telephone network or ISDN-network or broadband ISDN-network.
- 15 13. Teleconference equipment for use in a teleconference system according to patent claim 1, c h a r a c t e r i z e d in that receiving devices for reception of data are arranged for simultaneous
20 reception from a number of other subscribers, transmission devices for transmission of data to a number of subscribers and control devices for communication with a number of other subscribers and establishing of communication connections with a number
25 of other subscribers.
14. Teleconference equipment for use in telecommunications system according to patent claim 13, c h a r a c t e r i z e d in that mentioned conference
30 equipment is arranged to manage video communication.
15. Teleconference equipment for use in a telecommunications system according to patent claim 11, c h a r a c t e r i z e d in that mentioned conference
35 equipment is arranged to manage audio communication.

16. Teleconference equipment for use in a telecommunications system according to patent claim 15, characterized in that it is equipped with combination equipment for editing and combination of data received from participating subscribers in a teleconference.

17. Teleconference equipment for use in a telecommunications system according to patent claim 16, characterized in that mentioned editing equipment and combination equipment can be programmed by the user to present conference information to the user in one out of a number in advance programmed formats.

18. Teleconference equipment for use in a telecommunications system according to patent claim 16 or 17, characterized in that mentioned editing equipment and combination equipment can be programmed in advance by the user to present conference information to the user in format according to the user's own wishes.

19. Teleconference equipment for use in a teleconference system according to patent claims 13 to 18, characterized in that mentioned control device is arranged to, at command by the user, initiate connection to one out of a number of subscribers and transmit identification codes for mentioned selected subscribers to each of the selected subscribers.

20. Telecommunications equipment for use in a teleconference system according to patent claim 19, characterized in that mentioned control device is arranged to decide which of mentioned subscribers shall initiate communication connections with other participating subscribers in a teleconference

system and transmit identification codes to each of the subscribers and that respective subscriber individually initiates communication connections.

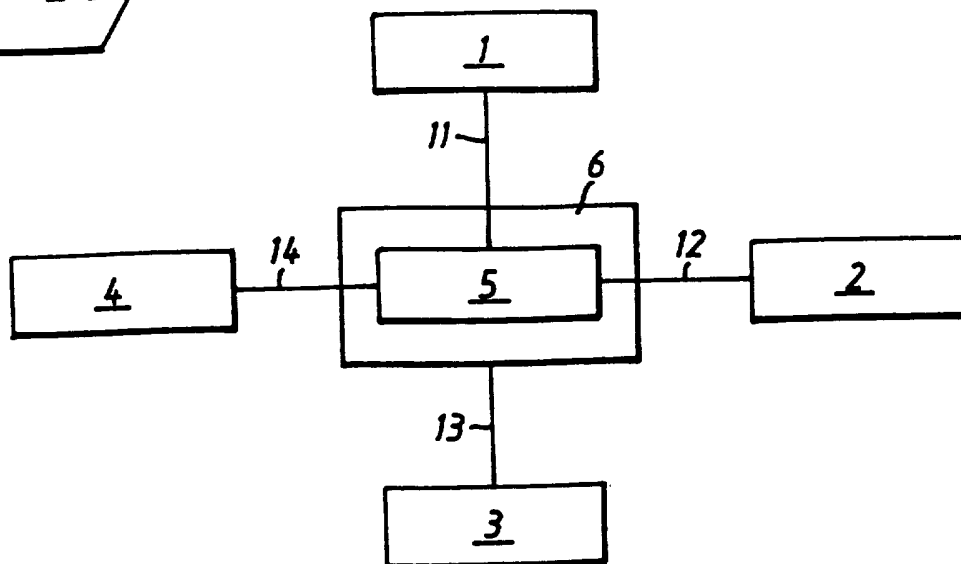
5 21. Teleconference equipment for use in a teleconference system according to patent claims 13 to 20,
c h a r a c t e r i z e d in that mentioned control
device is arranged to receive identification codes for
the selected subscribers to establish connection to each
10 of the mentioned subscribers and when the connection has
been established transmit a connection signal.

22. Method for establishing of teleconference between a
number of subscribers c h a r a c t e r i z e d in the
15 following steps:

a first subscriber establishes connection with each of a
number in advance selected subscribers and transmits to
these an initiating signal identifying the participants,
20 and

at reception of mentioned conference signal each of the
subscribers establishes a communication connection with
subscribers who are identified in mentioned
25 identification signal.

23. Method for establishing of teleconference between a
number of subscribers according to patent claim 22,
c h a r a c t e r i z e d in that each subscriber
30 decides the format in which conference data shall be
presented to him/her.

Fig. 1*Fig. 2*

Number of participants	Number of connections according to known technology	Number of connections according to the invention
2	2	1
3	3	3
4	4	6
5	5	10
6	6	15

Fig. 3

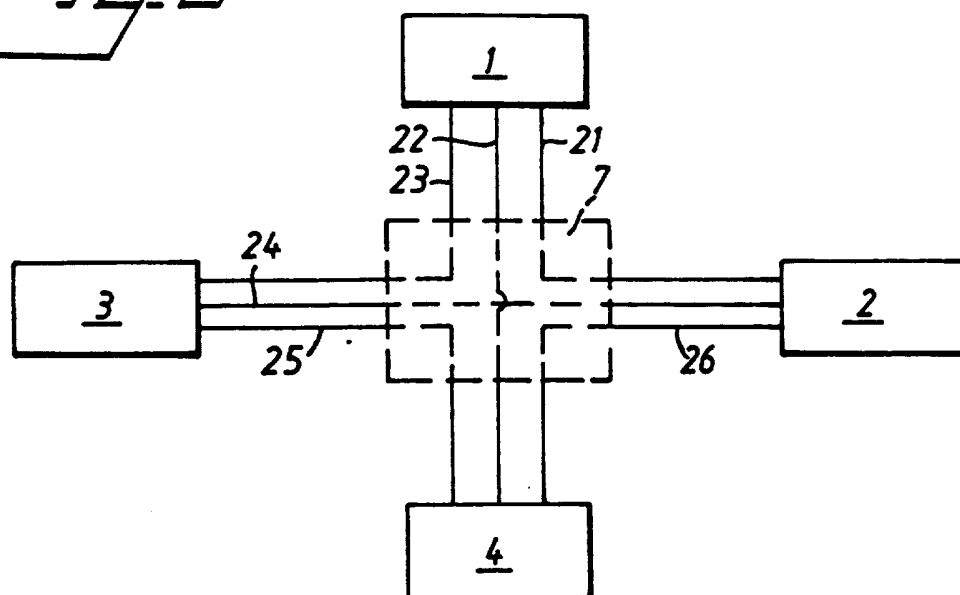
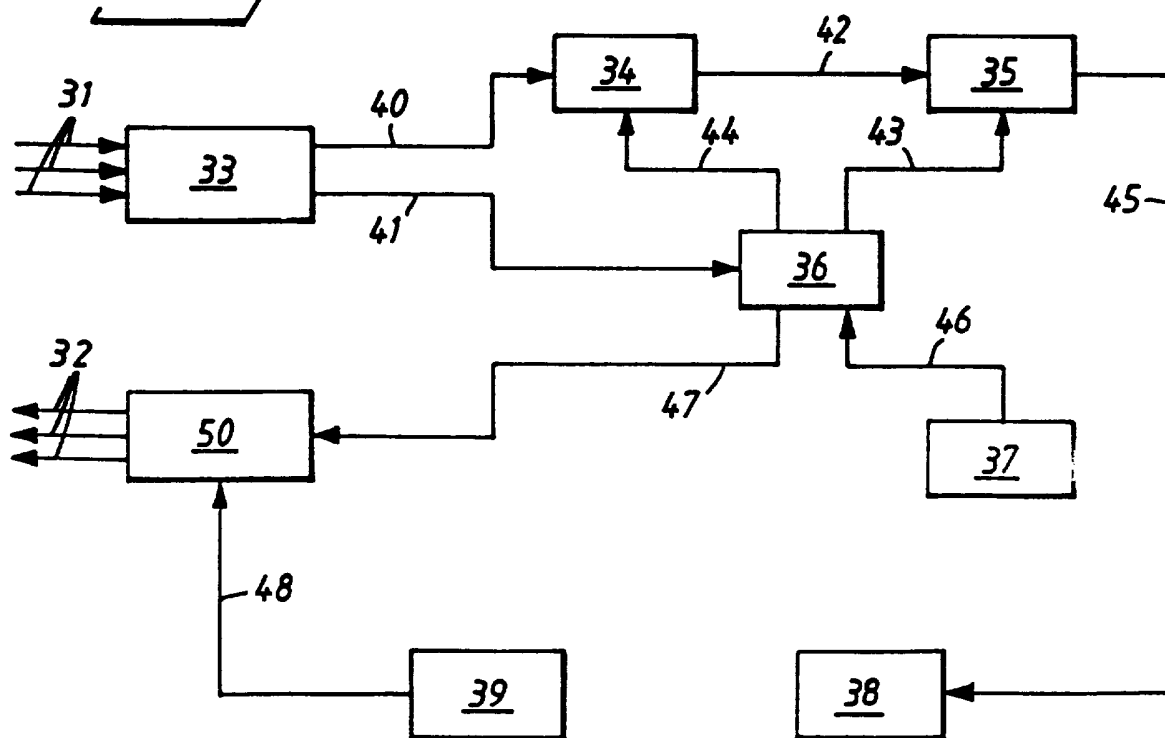


Fig. 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/00058

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04M 3/56, H04N 7/15

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, H04N

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.
X	US 4736407 A (NEIL DUMAS), 5 April 1988 (05.04.88), column 2, line 25 - line 34; column 2, line 56 - line 59, figure 1	1,13
Y	column 2, line 27	2-8,12,14-18
A	--	9-11,19-23
Y	EP 0351757 A2 (HITACHI, LTD), 24 January 1990 (24.01.90), column 1, line 42 - column 2, line 30	2-8,12,14-18
A	-- -----	9-11,19-23

☐ 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

29 April 1996

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT
Information on patent family members

01/04/96

International application No.
PCT/SE 96/00058

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US-A-	4736407	05/04/88	US-A-	4656654	07/04/87
EP-A2-	0351757	24/01/90	JP-A-	2027857	30/01/90