

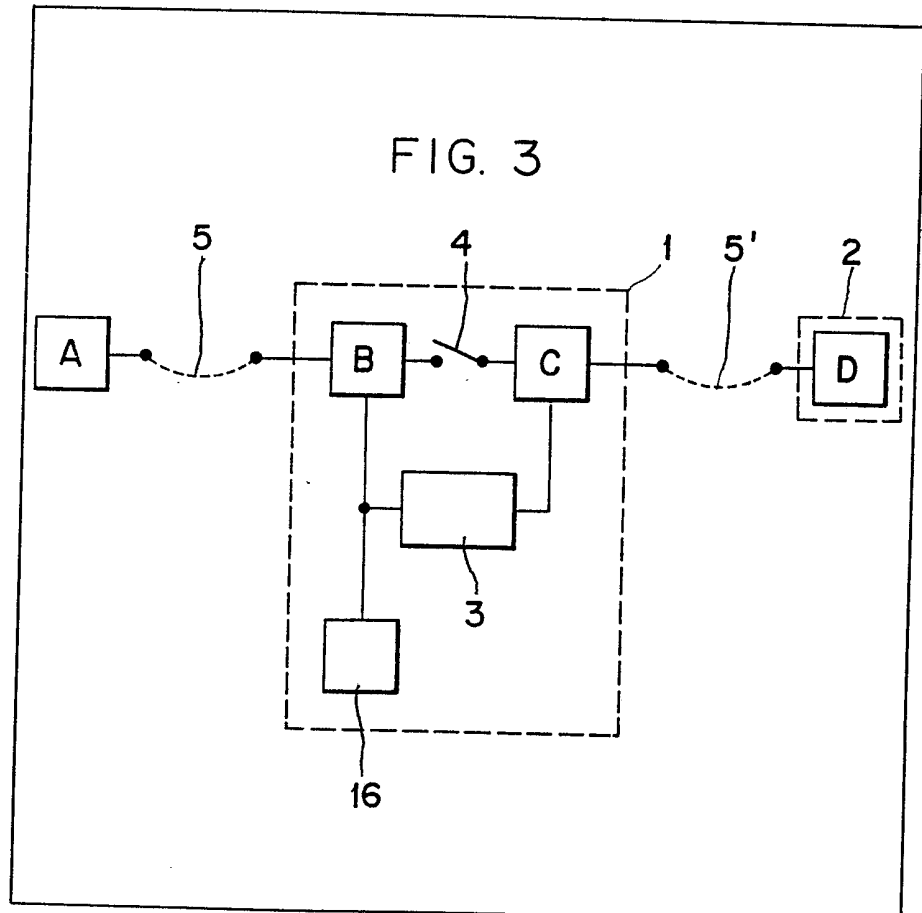
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(54) Telephone call transfer apparatus with receiving announcing means

(57) The telephone call transfer apparatus (3) has means (16) to

provide a message indicative of a calling state to a caller (A) while the caller is being transferred, thereby preventing the possibility of the caller ringing off by mistaking the comparatively long transfer operation as a failure in answering.



GB 2 130 848 A

FIG. 1

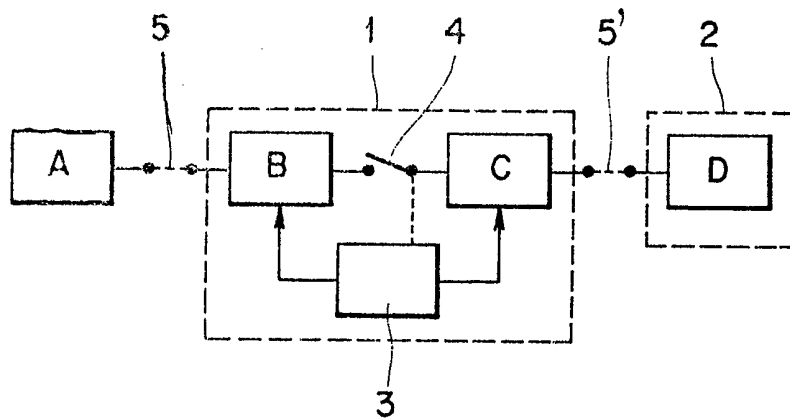
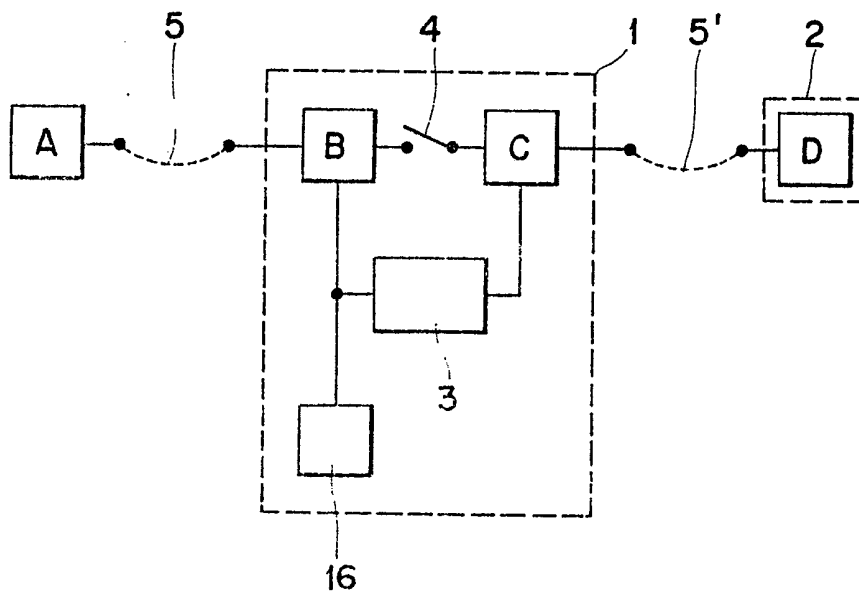


FIG. 3





## SPECIFICATION

**Telephone call transfer apparatus with receiving announcing means**

5 This invention relates to a telephone call transfer apparatus with receiving announcing means.

An object of the present invention is to provide a telephone call transfer apparatus with receiving announcing means, which can automatically  
10 provide a message indicative of a calling state to a caller while a call thereof is being transferred, thereby preventing the possibility of ringing off by mistaking the comparatively long transfer operation as failure of answering.

15 In a prior art telephone call transfer apparatus for automatically transferring a telephone call from Washington to New York over to Chicago, for instance, the telephone line in Chicago is connected only after seven to eight ringing signals  
20 (ringing sounds) are produced from the telephone set in New York. Therefore, it often happens that the person calling from Washington rings off by mistaking the transfer operation as the failure of answering.

25 This will now be described with reference to the drawings. Fig. 1 shows a well-known example. Reference numeral 1 designates an office in New York, and 2 an extension office in Chicago. Reference symbol A designates a public telephone set in Washington (i.e., a calling telephone set), B  
30 a receiving telephone set in the office 1 in New York (i.e., a called telephone), C a transmitting telephone set in the office 1 in New York, and D a destination telephone set in the extension office 2 in Chicago. Reference numeral 5 designates a telephone line leading from the public telephone set A in Washington to the receiving telephone set B in the office 1 in New York, 3 a telephone call transfer device connected to receiving and  
40 transmitting telephone sets B and C, 5' a transmitting side telephone line reading from the receiving telephone set C in the office 1 in New York to the destination telephone set D in the office 2 in Chicago, and 4 an automatic switch provided in the telephone call transfer device.

45 In the example of Fig. 1, when the office 1 in New York is called from the public telephone set A in Washington after a person in the office 1 in New York has left the office by setting the telephone call transfer device to a transfer state to transfer telephone calls to the extension office 2 in Chicago, the call is automatically transferred to the extension office 2 in Chicago.

55 More specifically, when a call is received in the receiving telephone set B in the office in New York, the telephone call transfer device 3 detects it and establishes the telephone line of the calling telephone set C while calling the destination telephone set D in the extension office 2 in  
60 Chicago by transmitting a preliminary memorized telephone number of the destination telephone set D through the telephone line 5' from the transmitting telephone set C.

When the handset of the destination telephone

65 set D in the extension office 2 in Chicago is unhooked, the telephone call transfer device 3 detects this and establishes the telephone line 5 of the receiving telephone set B. At the same time, it automatically closes the switch 4 in the telephone call transfer device 3 to establish the telephone  
70 lines of the receiving and transmitting telephone sets B and C. Now, communication between the public telephone set A in Washington and the destination telephone set D in the extension office 2 in Chicago can be made through the telephone lines of the receiving and transmitting telephone sets B and C.

75 When the public telephone set A in Washington or the destination telephone set D in the extension office in Chicago is hooked up after the communication between these telephone sets is over, the telephone call transfer device 3 detects this and releases the telephone lines of the receiving and transmitting telephone sets B and C  
80 while disconnecting the telephone line between the receiving and transmitting telephone sets B and C. The receiving telephone set B in the office in New York is now ready to receive a next call. In the prior art examples as described, it takes an interval corresponding to 7 to 8 ringing signals before the communication line is established by the telephone call transfer device 3.

85 According to the present invention, a message indicative of a state of transfer operation is automatically sent to the calling telephone set during the transfer operation to prevent the calling telephone set to be rung off by mistake while the transfer operation is in force.

In the accompanying drawings,

90 Fig. 1 is a block diagram showing a prior art telephone call transfer apparatus;

Fig. 2 is a connection diagram showing a telephone call transfer apparatus;

95 Fig. 3 is a block diagram showing a telephone call transfer apparatus according to the present invention; and

100 Fig. 4 is a detailed schematic representation of the telephone call transfer apparatus according to the present invention.

105 An embodiment of the present invention will now be described in detail with reference to the drawings. Fig. 2 shows a telephone system. Reference numeral 6 designates terminals connected to receiving side telephone line 5 via receiving telephone set B, and 15 terminals connected to transmitting side telephone line 5' via transmitting telephone set C. Reference numeral 7 designates a switch for holding the telephone line of the receiving telephone set B  
110 established for communication, 8 a switch for holding the telephone line of the transmitting telephone set C established for communication, 9 a calling signal detector connected to the receiving side telephone line 5 on the side of the receiving telephone set B, 10 a dial signal generator, 11 a answering detector, 12 a message tone generator, and 13 contacts of the switch 4 for connecting the receiving and transmitting telephone sets B and C via capacitor 14.

The dial signal generator 10, answering detector 11 and message tone generator 12 are connected to the receiving side telephone line 5' on the side of the transmitting telephone set through the terminals 15. The switches 7 and 4 are turned on in an interlocked relation to each other.

Fig. 3 shows a telephone system, which is the same as the prior art telephone system of Fig. 1 except for that a calling announcement adapter 16 for producing a message indicative of a state of a call transfer operation is provided. Fig. 4 shows the details of the system. Reference numeral 6 designates terminals connected to the telephone line of the receiving telephone set. Reference number 17 designates a receiving bell detector, 18 a holding relay for the receiving telephone set B operable by the receiving bell detector 17, 19 an announcement message transformer, 20 an announcement message amplifier, and 21 a magnetic tape (which carries an announcement message). Reference numeral 22 designates a stop signal. Reference numeral 23 designates a relay for connecting the telephone sets B and C, 24 an answering detector for detecting the answering of the destination telephone set in the extension office. Reference numeral 15 designates terminals connected to the telephone set C. Reference numeral 25 designates a dial signal generator, 26 a holding relay for the transmitting side telephone, 27 a tape start signal circuit, and 28 a message tone generator.

In operation, when the receiving telephone set B in the office in New York is called from the public telephone set A in Washington, a calling bell signal is transmitted from a repeater station to the receiving telephone set B. The receiving bell detector 17 detects this signal. (Heretofore, only the transmitting telephone set C is held operative while calling the destination of the call transfer from the dial signal generator). With the detection of the receiving bell signal, the holding relay 26 for the transmitting telephone set C is rendered operative to hold the telephone line thereof established for communication. At the same time, the holding relay 18 for the receiving telephone set B is also rendered operative. The tape start signal circuit 27 is thus rendered operative to send out an announcement message to the calling telephone set. While this message is being transmitted, the dial signal generator 25, in which the telephone number of the destination telephone set D in the extension office in Chicago is stored, is driven to call the destination telephone set D through the transmitting side telephone line 5' on the transmitting side. When the handset of the destination telephone set D in the extension office is unhooked, this is detected by the answering detector 24. To permit distinguishment as to whether the call to the telephone set D in the extension office is a transferred call or direct call, the message tone generator 28 is operated to transmit a signal sound or voice for several seconds, informing the person at the destination telephone set D of the fact that the call is a transferred call.

When the operative state of the message tone generator 28 is over, the relay 23 is rendered operative. As a result, the tape is stopped, and the call transfer relay device 3 renders the holding relay 18 for the receiving telephone set B operative to hold the telephone line of the receiving telephone set B established.

At the same time, it closes the switch 23 to establish the telephone circuit between the receiving and transmitting telephone sets B and C. In this state, communication between the telephone set A and destination telephone set D in the extension office can be made.

Heretofore, the establishment of the telephone line of the transmitting telephone set and the establishment of the telephone line between the receiving and transmitting telephone sets are effected after the operative state of the message tone generator is over, so that the signal sound or voice cannot be heard at the telephone set in the extension office although it is heard at the public telephone set A in Washington.

More specifically, the prior art telephone call transfer device operates in a sequence of:

(a) detection by the receiving signal detector,  
(b) energization of the holding relay for the transmitting telephone set,

(c) operation of the dial signal generator,  
(d) detection of answering by the answering detector,

(e) operation of the message tone generator, and

(f) energization of the holding relay for the transmitting telephone set and closure of connection switch. This sequence of operations requires a time interval corresponding to 7 to 8 ringing signals. Therefore, it sometimes happens that the telephone set is rung off by mistaking the call transfer operation as the failure of answering.

With the telephone call transfer apparatus with call announcing means according to the present invention, a magnetic tape reproducing device is incorporated in a telephone call transfer apparatus, which comprises a holding relay for holding a receiving side telephone line and a transmitting side telephone line connected each other for communication through these telephone lines, a holding relay for holding the receiving telephone line established, a dial signal generator for calling a designation telephone set, a receiving bell detector connected to the receiving the telephone line, an answering detector connected to the transmitting side telephone line and a message tone generator connected to the transmitting side telephone line for discriminating a call is a transferred call or a direct call, the magnetic tape reproducing device being operated to transmit an announcement message to a calling telephone set in response to the output of the receiving bell detector to the public telephone set in Washington. Thus, there is no possibility of ringing off during the call transfer operation corresponding to 7 to 8 ringing signals because the announcement message indicative of the state of the call transfer operation is transmitted to the

calling telephone set during the call transfer operation.

#### CLAIMS

1. A telephone call transfer apparatus with call announcing means comprising a holding relay for holding a receiving side telephone line and a transmitting side telephone line connected to each other for communication through these telephone lines, a holding relay for holding said receiving telephone line established, a dial signal generator for calling a destination telephone set, a receiving bell detector connected to said receiving side telephone line, an answering detector connected to said transmitting side telephone line and a
- 15 message tone generator connected to said transmitting side telephone line for discriminating whether a call is a transferred call or a direct call, characterized in that:
- a magnetic tape reproducing device is provided such that it is operated to transmit an announcement message to a calling telephone set in response to the output of said receiving bell detector.
2. A telephone call transfer apparatus substantially as hereinbefore described with reference to Figures 2 to 4 of the accompanying drawings.
3. The features herein described, or their equivalents, in any patentably novel selection.