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(54) **Auto dialling facsimile apparatus.**

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US-A- 3 899 645

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EP 0 265 963 B1

Description

The present invention relates to a facsimile apparatus having an automatic dialling feature.

With a conventional facsimile apparatus which uses an auto dialling circuit for establishing a facsimile call through a telephone network in response to manual entry of an abbreviated called station number or operation of a specified key, a timer is provided to measure the amount of time elapsed from the time of completion of the facsimile call and time out if it exceeds a preset value before the called station answers, allowing the calling station to regard that the called station is busy.

As a result, it is necessary for the prior art auto dialling facsimile apparatus to preset the timer in accordance with an access time taken to establish a connection to the farthest of the registered destinations.

Since the call establishment time usually varies with the distance to destination, the preset value is greater than is necessary for calls to short distance destinations and therefore the apparatus Unnecessarily holds switched connections to short distance destinations for a long period of time.

Such an automatic dialling apparatus is disclosed for example in US-A-3 899 645 and EP-A-0 195 258.

It is therefore an object of the present invention to provide an auto dialling facsimile apparatus and a corresponding method which holds the switched connection for a length of time which is uniquely determined by the destination.

This object is achieved by the features of the claims. The present invention particularly comprises the features storing access time data in a memory uniquely corresponding to specified destinations and releasing a switched connection to a desired destination if the amount of time elapsed from the establishment of the connection exceeds the access time uniquely associated with the called station.

Furthermore, data representive of telephone numbers of specified destinations are stored in a first memory and data representative of access time intervals are stored in a second memory corresponding respectively to the specified destinations. The stored data are retrieved from the first and second memory in response to the entry of an abbreviated dialing number of a called station or operation of a key uniquely associated with the called station. Telephone switching signal is transmitted to the telephone line in response to data retrieved from the first memory to establish a switched connection to the desired destination. The length of time elapsed from the time said dialling signal is transmitted is measured, the measured time length being reset when a valid signal is transmitted from the destination. The switched connection is released when the measured time length exceeds a value determined by the access time data retrieved from the second memory.

The present invention will be described in further detail with reference to the accompanying sole drawing, in which a block diagram of an auto dialling facsimile apparatus of the present invention is shown.

Referring to the drawing, there is shown an auto dialling facsimile apparatus according to the present invention. The apparatus comprises a scanner 1 for reading a document to be transmitted and generating a facsimile message in analog form. The analog message signal is digitized by an encoder 2 if required and modulated upon a carrier by a modem 3 and fed to one input of a switch 4, the output of which is coupled through a subscriber loop 5 to an end office of a general switched telephone network. Modem 3 provides demodulation of a received signal. A decoder 6 is connected to the modem 3 for decoding the demodulated signal if it is in digital form and applying the decoded signal to a printer 7. A dialling circuit 8 is connected to a second input of the switch 4 for automatically performing a call establishment procedure (termed phase A according to the CCITT Recommendation T.30) to set up a facsimile call to a desired station.

A controller 9 is provided for controlling all the above-mentioned units. Controller 9 is further associated with a destination address memory 10, an access time memory 11 and a timer 12. A keyboard 13 is also connected to the controller 9 for entry of destination address data, or telephone numbers of specified destinations into address memory 10 and for entry of access time data into time memory 11. The address data of a specified destination is read out of the memory 10 when an abbreviated dialling number of the called station is entered or a key uniquely assigned to it is operated on the keyboard 13. The access time data defines the amount of time necessary to establish a facsimile call to each of the specified destinations. The access time T_0 of each of the specified destinations is determined by the average of the access time intervals which vary between different destinations depending on the domestic and international network parameters. The access time data T_0 is registered into memory 11 in a storage location addressable as a function of an input signal such as the abbreviated dialling number of a desired destination or as a function of the called station unique key and is read out of the memory 11 when such input signal is entered during call establishment phase. Controller 9 arithmetically sums the access time read out of the memory 11 with a time-out T_1 which defines the amount of

time two stations will continue to attempt to identify each other. According to the CCITT Recommendation T.30, T_1 is set equal to 35 ± 5 seconds, begins upon entering phase B, and is reset upon detecting a valid signal or when T_1 times out. The total time period of T_0 + T_1 is preset into the timer 12. Timer 12 is triggered in response to the dialling circuit 8 completing the transmission of the address signal of a destination station to the telephone network in accordance with a destination address read out of the address memory 10. Timer 12 measures the length of time elapsed from the time it is triggered immediately following the completion of the dialling procedure and generates an absence-of-answer signal when the elapsed time exceeds the preset value before the calling station receives a called station identification (CED) upon entering phase B.

In operation, the abbreviated dialling number of a desired station is manually entered or a unique key of the called station is operated, with a document being set in the apparatus. Controller 9 reads a corresponding destination address out of the address memory 10 into dialling circuit 8, controls the switch 4 to connect the output of the dialling circuit 8 to the subscriber loop 5 and causes the dialling circuit 8 to initiate dialling. When the last digit of the dialled information is sent, the controller 9 directs the switch 4 to connect the modem 3 to the subscriber loop 5 to make the apparatus ready to receive a CED. Controller 9 then addresses the access time memory 11 to read the corresponding access time data and sums it with the time-out period T_1 and presets the sum into the timer 12. The called station will receive ringing signals if the line is idle to close its loop. After presetting the timer 12, the controller 9 monitors an output of the modem 3 to detect a CED and a digital identification signal (DIS) which are transmitted in succession in response to the called station closing the loop. On receipt of the digital identification signal, the controller 9 resets the timer 12. If the called station is not idle, no CED and DIS are received and T_1 times out, resetting the timer 12.

It is seen that the telephone connection is not held for an unnecessarily long period of time for receiving an answer signal from short distance destinations.

Claims

1. A method for establishing in an auto-dialling facsimile apparatus, a facsimile call to a desired facsimile station corresponding to a desired destination of a plurality of specified destinations comprising the steps of:

   a) storing data representative of telephone numbers of said specified destinations in first memory means;

   b) storing data representative of access time intervals corresponding respectively and uniquely to said destinations in second memory means;

   c) retrieving data from said first and second memory means in accordance with the desired one of said destinations;

   d) transmitting a dialling signal in the form of a telephone switching signal to a switched telecommunication network in accordance with said data retrieved from said first memory means to establish a switched connection;

   e) measuring the length of time elapsed from the time said transmitting of said dialling signal is completed by the step (d) and resetting the measured time length when a valid signal is transmitted from said desired destination; and

   f) releasing said switched connection when said measured time length exceeds a value determined by the data retrieved from said second memory means.

2. An auto-dialling facsimile apparatus comprising:

   first memory means (10) for storing data representative of telephone numbers of specified destinations;

   second memory means (11) for storing data representative of access time intervals corresponding respectively and uniquely to said destinations;

   means (9) for accessing said first and second memory means for retrieving data therefrom in response to a desired one of said destinations;

   means (8) for transmitting a telephone switching signal to a switched telecommunication network in accordance with said data retrieved from said first memory means to establish a switched connection; and

   timing means (12) for measuring the length of time elapsed from the time the transmission of said dialling signal is completed and releasing said switched connection when said measured time length exceeds a value determined by the said data retrieved from said second memory means, said timing means being resettable upon receipt of a valid signal transmitted from said desired destination.

Revendications

1. Procédé pour établir dans un appareil de fac-similé à composition automatique des numéros, un appel de fac-similé vers un poste de

fac-similé désiré correspondant à une destination souhaitée dans une multitude de destinations spécifiées, comprenant les étapes consistant à :

a) stocker une donnée représentative des numéros de téléphone desdites destinations spécifiées dans un premier moyen de mémoire;

b) stocker une donnée représentative des intervalles de temps d'accès correspondant respectivement et uniquement auxdites destinations dans un second moyen de mémoire;

c) récupérer la donnée dans les premier et second moyens de mémoire en conformité avec la destination souhaitée parmi lesdites destinations;

d) transmettre un signal de composition de numéro sous la forme d'un signal de commutation téléphonique à un réseau de télécommunication commuté en conformité avec ladite donnée récupérée dans ledit premier moyen de mémoire pour établir une connexion commutée;

e) mesurer le laps de temps écoulé entre l'instant ou ladite transmission dudit signal de composition de numéro est achevée par l'étape (d) et remettre à zéro le laps de temps mesuré lorsqu'un signal valable est transmis à partir de ladite destination souhaitée; et

f) libérer ladite connexion commutée lorsque ledit laps de temps mesuré dépasse une valeur déterminée par la donnée récupérée dans ledit second moyen de mémoire.

2. Appareil de fac-similé à formation automatique des numéros, comprenant :

- un premier moyen de mémoire (10) pour stocker une donnée représentative des numéros de téléphone de destinations spécifiées;
- un second moyen de mémoire (11) pour stocker une donnée représentative des intervalles de temps d'accès correspondant respectivement et uniquement auxdites destinations;
- un moyen (9) pour accéder auxdits premier et second moyens de mémoire pour récupérer une donnée dans ceux-ci en réponse à une destination souhaitée parmi lesdites destinations;
- un moyen (8) pour transmettre un signal de commutation téléphonique à un réseau de télécommunication commuté en conformité avec ladite donnée récupérée dans ledit premier moyen de mémoire et établir une connexion commutée; et
- un moyen temporel (12) pour mesurer le laps de temps écoulé entre l'instant où la transmission dudit signal de composition de numéro est achevée et la libération de ladite connexion commutée lorsque ledit laps de temps mesuré dépasse une valeur déterminée par ladite valeur récupérée dans ledit second moyen de mémoire, ledit moyen temporel pouvant être remis à zéro lors de la réception d'un signal valable transmis à partir de ladite destination souhaitée.

Patentansprüche

1. Verfahren zum Einrichten in einer Selbstwähl-Facsimilevorrichtung eines Facsimileanrufs zu einer gewünschten Facsimilestation, die einem gewünschten Ziel von mehreren bestimmten Zielen entspricht, mit den Schritten:

a) Speichern von Daten in einer ersten Speichereinrichtung, die Telefonnummern von bestimmten Zielen darstellen,

b) Speichern von Daten in einer zweiten Speichereinrichtung, die Zugriffszeitintervalle darstellen, die jeweils einzeln den Zielen entsprechen,

c) Wiedergewinnen von Daten aus der ersten und zweiten Speichereinrichtung entsprechend einem gewünschten der Ziele,

d) Senden eines Wählsignals in der Form eines Telefonschaltsignals zu einem geschalteten Telekommunikationsnetzwerk entsprechend den aus der ersten Speichereinrichtung wiedergewonnenen Daten, so daß eine geschaltete Verbindung eingerichtet wird,

e) Messen der Zeitlängen ab dem Zeitpunkt, wenn das Senden des Wählsignals durch den Schritt (d) abgeschlossen ist, und Zurücksetzen der gemessenen Zeitlänge, wenn ein gültiges Signal von dem gewünschten Ziel gesendet wird, und

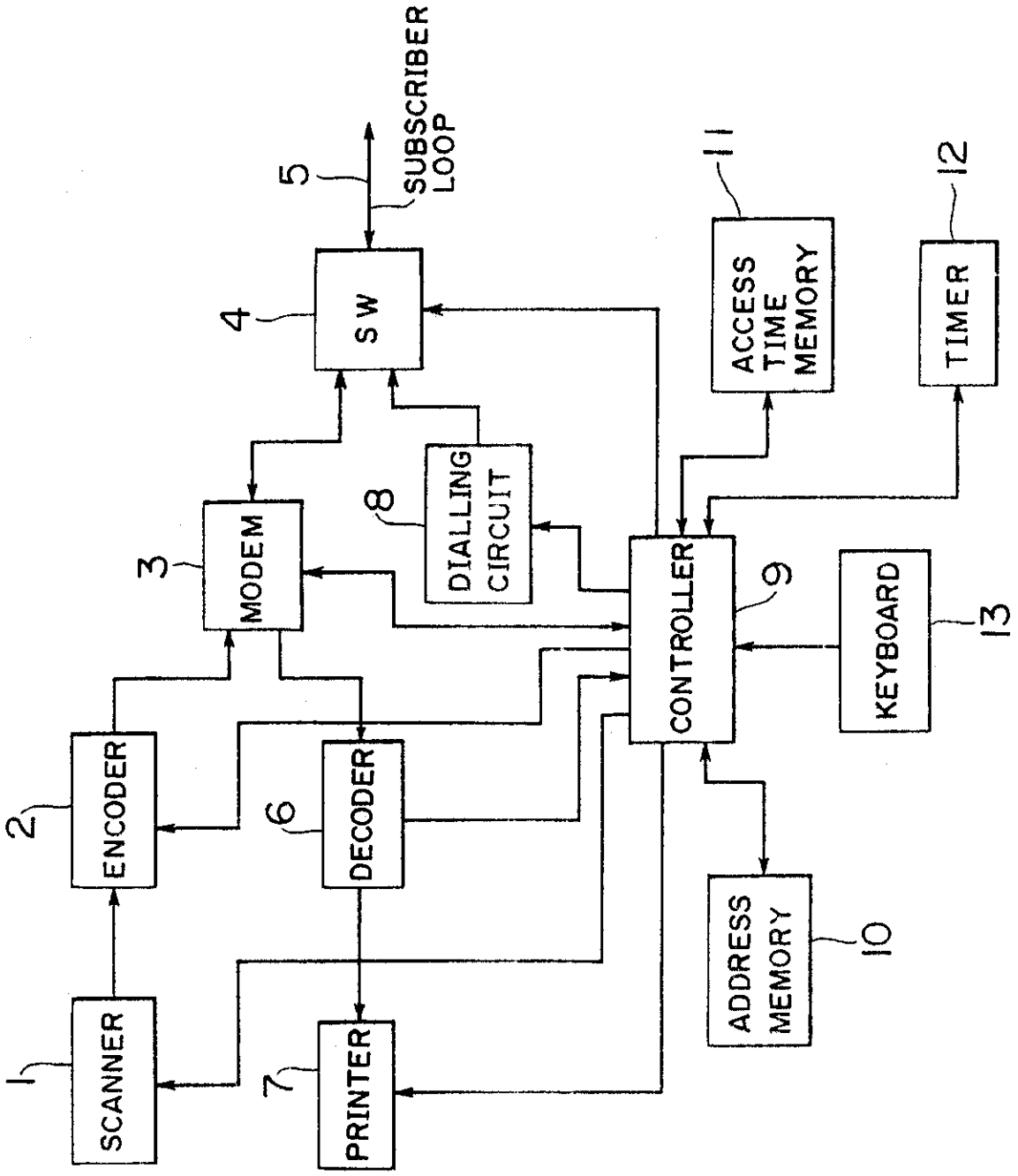
f) Freigeben der geschalteten Verbindung, wenn die gemessene Zeitlänge einen Wert übersteigt, der durch die aus der zweiten Speichereinrichtung wiedergewonnenen Daten bestimmt wird.

2. Selbstwähl-Facsimilevorrichtung mit:
einer ersten Speichereinrichtung (10) zum Speichern von Daten, die Telefonnummern von bestimmten Zielen darstellen,
einer zweiten Speichereinrichtung (11) zum Speichern von Daten, die Zugriffszeitintervalle darstellen, die jeweils einzeln den Zielen entsprechen,

einer Einrichtung (9) zum Zugreifen auf die erste und die zweite Speichereinrichtung zum Wiedergewinnen von Daten als Antwort auf ein gewünschtes der Ziele,

einer Einrichtung (8) zum Senden eines Telefonschaltsignals zu einem geschalteten Telekommunikationsnetzwerk entsprechend den aus der ersten Speichereinrichtung wiedergewonnenen Daten, so daß eine geschaltete Verbindung eingerichtet wird, und

eine Zeitgebereinrichtung (12) zum Messen der Zeitlänge, die von dem Zeitpunkt vergangen ist, an dem das Senden des Wählsignals abgeschlossen ist, und Freigeben der geschalteten Verbindung, wenn die gemessene Zeitlänge einen Wert übersteigt, der durch die aus der zweiten Speichereinrichtung wiedergewonnenen Daten bestimmt wird, wobei die Zeitgebereinrichtung bei einem Empfang eines gültigen Signals, das von dem gewünschten Ziel gesendet wird, rücksetzbar ist.


SCANNER
1
ENCODER
2
MODEM
3
SW
4
5
SUBSCRIBER LOOP
DECODER
6
PRINTER
7
DIALLING CIRCUIT
8
CONTROLLER
9
ADDRESS MEMORY
10
ACCESS TIME MEMORY
11
TIMER
12
KEYBOARD
13

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