FORM 1

60C242

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

APPLICATION FOR A STANDARD PATENT

AUSTRALIAN PATENT OFFICE See 34(4)

LODGED AT SUB-OFFICE

SECTION 34(4)(a) DIRECTION SEE FOLIO 12

NAME DIRECTED Ross Noel McGee
of: 25 Panorama Crescent Buderim Qld 4556
and
5 Victoria Parade, Coochie Mudlo Island Qld 4163., Australia.

AUSTRALIA SIXTY DOLLARS

hereby apply for the grant of a Patent for an invention entitled:-

LATE LODGEMENT

"BROADCASTING SYSTEMS"

which is described in the accompanying provisional specification.

~~We~~ Our address for service is: PIZZEY & COMPANY PATENT ATTORNEYS, OF 4th Floor, Qantas House, 262 Adelaide Street, BRISBANE. Q 4000. AUSTRALIA.

Dated this twenty-sixth day of September, 1986.

by PIZZEY & COMPANY PATENT ATTORNEYS.

.....
(J.K. Pizzey)

APPLICATION ACCEPTED AND AMENDMENTS ALLOWED 8-1-91

To: The Commissioner of Patents,
Commonwealth of Australia.

FORM 7

AUSTRALIA
Patents Act 1952

DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT

In support of the Application by ROSS McGEE for a Patent for the invention entitled "BROADCASTING SYSTEMS".

I, ROSS MCGEE
of ~~5 Victoria Parade, Coochie Mudlo Island, Queensland 4163~~ 28 PANORAMA CRESCENT, BIRKDALE, QLD. 4556

do solemly and sincerely declare as follows:-

1. I am the applicant for the patent.

2. GREGORY EATON of 47 Sebring Street, Holland Park, Queensland 4121 is the actual inventor and the facts upon which I am entitled to make the application are as follows:

   (a) By assignment from Gregory Eaton to John Conley and Ross McGee who are the original co-applicants.

   (b) JOHN CONLEY has assigned his interest in the application to ROSS McGEE.

   (c) Pursuant to the provisions of Section 34(4) of the Patents Act 1952, the Application is proceeding in the name of ROSS McGEE.

DECLARED AT BIRKDALE THIS 17th. DAY OF OCTOBER, 1990.

TO:- THE COMMISSIONER OF PATENTS

.....
ROSS McGEE

(12) PATENT ABRIDGMENT (11) Document No. AU-B-78298/87
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 608242

(54) Title
BROADCAST SYSTEM

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(56) Prior Art Documents
AU 459928 26200/71 05.42
AU 509088 15046/76 H04N 7/00 1/02

(57) Claim

10. A communication method whereby entertainment generated from a broadcasted signal may at intervals between entertainment items include a selected one of a plurality of simultaneously transmitted communication signals, the method including:-

forming an entertainment transmission signal;

compressing individual communication signals;

sequentially combining said compressed communication signals and said entertainment transmission signal at selected intervals to form a multiplexed modified entertainment transmission signal;

transmitting the modified entertainment transmission signal;

receiving the modified entertainment transmission signal, and

generating the broadcast signal by expanding the multiplexed signal in said intervals, and broadcasting the entertainment signal and a selected one of the expanded communication signals in said intervals between entertainment items.

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

JOHN CONLEY

and

ROSS McGEE

(Patent Application Numbers PH 07949 and PH 08204)

COMPLETE SPECIFICATION FOR THE INVENTION ENTITLED:-

"BROADCASTING SYSTEMS"

The following statement is a full description of this invention, including the best method of performing it known to us:-

This invention relates to communication systems.

In particular this invention relates to a radio broadcasting system including two-way radio broadcasting systems but it is to be understood that it can also be adapted for television broadcasting systems, closed circuit communication systems and other audio visual displays. However for illustrative purposes this invention will be described hereinafter with reference to radio broadcasting systems.

In the presently available commercial radio broadcast systems it is not possible to regulate the distribution of a broadcast programme nor is it possible to restrict a programme having an entertainment context together with advertising segments to be targeted for reception only by selected audiences. For example it is not known to provide a single broadcast which may include advertising segments relating to for instance holiday accommodation for reception only by tourist outlets as well as advertising segments relating to entertainment venues for reception only by motel or hotel guests. Furthermore it is not known to provide advertising segments in several languages so that a receiver can be switched for receiving the advertising context in a selected one of the broadcast languages.

At present restrictive reception can only be provided by broadcasting a special coded signal which is decoded upon

receipt by selected users. Such systems are relatively complex and require the use of specialised broadcasting and reception equipment. Additionally in tow-way radio broadcasting the limited number of available frequencies necessitates that in periods of heavy demand, users have to wait their turn to transmit. This is often very inconvenient.

The present invention aims to alleviate the abovementioned disadvantages and to provide improved communication systems which will be reliable and efficient in use. Other objects and advantages of this invention will hereinafter become apparent.

With the foregoing and other objects in view, this invention in one aspect resides broadly in a communication method whereby a broadcast signal having a first signal component for unrestricted communication and a plurality of second signal components, each said second signal component being for restricted communication, may at intervals between successive first signal components for unrestricted communications include a selected one of said plurality of simultaneously transmitted second signal components for restricted communication, the method including:-

forming a modified transmission signal by,

a] arranging a plurality of individual second signal components for communication signals into discrete time coded slots;

b] sequentially combining said discrete coded time slots into a multiplexed restricted communication signal, and

c] slotting said multiplexed restricted communication signal into an unrestricted communication signal to form a modified transmission signal;

transmitting the modified transmission signal;

receiving the modified transmission signal, and

generating the broadcast signal by,

a] selecting a discrete time slot in said multiplexed restricted communication signal

b] combining the signals in said selected discrete time slot to form a selected second signal component for restricted communication signal, and

c] combining said first signal component for unrestricted communication with said selected second signal component for restricted communication to generate the broadcast signal.

In a preferred embodiment the unrestricted communication

is entertainment. Preferably the transmission signal is broadcast within the bandwidth of a standard broadcast transmitter whereby the broadcast signal may be received by a standard receiver, which may be a standard broadcast receiver or a standard two-way radio receiver. It is also preferred that the message segments or restricted communication segment be time compressed prior to transmission. This may be achieved by digital signal processing but preferably it is achieved by analog circuits such as signal sampling and storage of the sampled signal in analog form as charges in a plurality of capacitors. The entertainment segments and the message segments may be arranged in series in a single channel transmission or in a channel of a multi-channel transmission such as a stereo transmission. A stereo transmission may be provided having the entertainment segments on one channel and the message segments on the other channel. Alternatively the entertainment segment could be transmitted in stereo and one or both of the channels could be utilized for broadcasting the message segments.

In a further aspect this invention resides broadly in broadcasting receiving apparatus for use in a communication method as defined above including demultiplexing means and time expansion means in the signal path between said broadcast receiver and a speaker thereof. Preferably the transmission receiving means is a standard radio receiver or

a two-way radio receiver/transmitter and the decoding means is arranged in the external connections between the standard receiver and its associated loudspeaker assembly.

In a typical embodiment of this invention utilizing FM stereo broadcasting system one channel could be used to transmit coded or suitably scrambled music while the other channel could be fed with a signal composed of any number of separate audio channels being speech or music or both. These channels could be mixed using a time division multiplex system. Such a signal could be transmitted by a conventional FM stereo broadcasting transmitter and could be received by a standard FM stereo receiver, the latter having a demultiplexer arranged in series with the speaker leads.

The demultiplexer would be set or be settable to select a specific time slot in the message train for reproduction of selected messages or restricted communications from the transmitted signal. Accordingly a single transmission may be provided which may be received by selected receivers which may be set to alternative time slots so that different programmes may be heard from the selected receivers. Furthermore one or selected ones of the multiplexed channels or time slots could be included in all programmes and have priority over and above all other time slots or channels for transmission of urgent messages.

In a further aspect this invention resides broadly in a

method of communication including:-

broadcasting a multiplexed transmission signal;

providing receivers for receiving the transmission signal and each being adapted to relay to respective users through their loudspeakers information contained in selected time slots in the signal whereby a plurality of users are able to simultaneously transmit private messages at any time on a single transmission which will be heard only by selected users.

For example such a method could be used by a vehicle fleet owner having two-way radio receivers/transmitters for transmitting private messages between vehicles in the fleet and a base station. The latter could service many fleet owners each having allocated thereto selected time slot segments in the multiplexed transmission signal which is available for their sole use. Thus even though many users may be using the same frequency, they would not hear the messages transmitted by other users and they would not have to wait for free space to transmit their messages.

In order that this invention may be more readily understood and put into practical effect, reference will now be made to a typical embodiment of this invention illustrated in the accompanying schematic.

According to the illustrated embodiment an audio signal is prepared for transmission by a conventional FM broadcast

transmitter 10 by providing a plurality of separate audio inputs 11 and a time base 14 which provides a timing input to a multiplexer 13 which forms cyclic message trains each having a plurality of successive time slots which contain the inputs from the respective audio channels 11. Each message train may be approximately three milliseconds in length and may contain for example ten time slots. Each time slot may contain compressed or expanded information.

This compression or expansion is achieved by either one or both of the following processes. The most common process used in this system is that of time compression using a plurality of analog storage devices commonly called bucket brigade devices 12. These contain a series of analog voltage storage elements in the form of capacitors which may be charged sequentially to selected voltages and which may have these selected voltages read out sequentially to an output. The audio inputs 11 are each continuously sampled, and the samples of each audio input are stored in real time in a bucket brigade device 12. When a packet of audio is transferred from the output of a bucket brigade device 12 to an input of the multiplexer 13, the analog data is read out at a rate that allows it to be time compressed (that is at a faster rate), and at a time within the cycle of the time base 14 which allows many inputs to be placed end to end in an output pulse train that can be decoded at the receiver

selectively to produce any or all of the input signals. Signal conditioning is also incorporated to prevent spurious noise and harmonics from interfering with the signal quality. These signal conditioners 15 can be simple analog filters or more complex graphic equalizers in the case of music or entertainment channels. Other forms of signal conditioners could be used such as volume compressors and limiters but their use would depend on the type of signal 11 and the output quality desired. The time base 14 is also utilised to superimpose on the composite audio signal a recognizable reference in the form of synchronising pulses 16 which may be separated from the composite audio signal within a receiver and utilised to set the timing parameters for the demultiplexing and decompressing circuitry.

The composite audio signal emanating from the multiplexer 13 is relayed to the standard broadcast transmitter 10 whereby the signal is broadcast at a selected frequency. As the signal is a coded signal it cannot be gainfully utilized by standard FM receivers unless the receiving apparatus is adapted to decode the transmitted signal. For this purpose the present invention utilizes a standard FM receiver 20 provided with a decoder assembly 21 comprising a demultiplexer 22 and a decompressor 23 in the lead 24 to the speaker assembly 25. The demultiplexer 22 and the decompressor 23 are associated with a further time base

signal generator 26, the operation of which is synchronised with the time base 14 by the synchronising pulses 16. The demultiplexer 22 selects the time slot portions of the message train which contain the information necessary to produce the desired audio input, and these time slot portions are transferred to the decompressor 23 which is in the form of a bucket brigade device.

The input to the decompressor 23 is sampled at a selected input frequency and stored in real time in the bucket brigade device storage elements. The outputs from the storage elements are read out at a frequency lower than the selected input frequency such that the original time base of the input audio signal 11 is restored. The output from the decompressor 23 is fed to the output mixer 27 and thence to the amplifier and speaker assembly 25. The time slots to be selected by the demultiplexer 22 may be designated in a fixed code source 28 associated with the time base 26 or it may be adjustable whereby it may be switched between a plurality of positions each designating a specific time slot or slots to be relayed to the speaker assembly 25. If desired a memory 29 may be placed between the decoder 21 and the speaker assembly 25 and this may be adapted to store a pre-determined number of message trains prior to transmitting the signal to the speaker assembly 25.

The audio channels may include for example an input for

background music through channel 1 and advertising messages in three different languages in channels 2, 3 and 4. These four channels are merged into a single audio transmission in message trains each containing successive time slots for the respective channels. The signal transmitted by the standard transmitter 10 may be received by the standard broadcast receiver 20 and fed to the speaker assembly 25 through the decoder 21. The latter may be programmed to relay the music channel and the information in a respective time slot so that for example commentary is provided in the selected language. If the code source 28 is adjustable the user may switch the code means to a respective channel to receive commentary in any one of the broadcast languages.

Of course such a method may also be utilized in closed circuit transmission such as for a motel or the like so that foreign guests in the hotel can receive programmes, such as radio or television programmes in their own language. For video broadcasting the signals may be compressed and stored in a memory prior to transmission. Also for use in two-way transmission the base station could provide a time reference for the purpose of the mobile transmitter so that an interrupted signal could be transmitted which would synchronize with other transmissions for reception by a single base receiver. Alternatively separate base receivers could be used for the respective groups of users.

Signal enhancing means may be provided if desired. Furthermore one channel of an FM broadcast may be coded and the other channel may provide full time entertainment. The coded channel may be arranged to interrupt the other channel at any stage to enable messages to be heard by selected receivers. Thus, for example, vehicles fitted with conventional radio receivers may have their receivers simply modified to receive selected messages, such as paging messages, through their radio.

This invention may be utilized in the sound track of an audio visual recording whereby a plurality of languages may be on the one sound track whereby any selected one of the languages may be utilized by a user. Such a system could be provided in picture theatres or in home videos or in a television broadcast.

Of course it will be realised that while the above has been given only by way of illustrative example of the present invention, all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as defined in the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A communication method whereby a broadcast signal having a first signal component for unrestricted communication and a plurality of second signal components, each said second signal component being for restricted communication, may at intervals between successive first signal components for unrestricted communications include a selected one of said plurality of simultaneously transmitted second signal components for restricted communication, the method including:-

forming a modified transmission signal by,

a] arranging said plurality of individual second signal components for restricted communication into discrete time coded slots;

b] sequentially combining said discrete coded time slots into a multiplexed restricted communication signal, and

c] slotting said multiplexed restricted communication signal into an unrestricted communication signal to form a modified transmission signal;

transmitting the modified transmission signal;

receiving the modified transmission signal, and

generating the broadcast signal by,

a] selecting a discrete time slot in said multiplexed restricted communication signal

b] combining the signals in said selected discrete time slot to form a selected second signal component for restricted communication, and

c] combining said first signal component for unrestricted communication with said selected second signal component for restricted communication to generate the broadcast signal.

2. A communication method according to claim 1, wherein said modified transmission signal is broadcast within a bandwidth of a standard frequency bandwidth to be receivable by a standard receiver.

3. A communication method according to claim 1 or 2, wherein said modified transmission signal is a multi-channel signal having unrestricted communications in one channel and restricted communications in another channel.

4. A communication method according to claim 1, wherein said multiplexed restricted communication signal contains discrete time slots which are time division multiplexed.

5. A communication method according to claim 4, wherein selected discrete time slots are time compressed before transmission.

6. A communication method according to claim 5, wherein said selected discrete time slots are time compressed by analog circuitry techniques.

7. A communication method according to claim 6, wherein said analog circuitry techniques including:-

sampling the amplitude of input signals including said discrete time slots at a selected frequency;

storing said sampled amplitudes in analog voltage form as charges in capacitors;

reading said analog voltages at a higher frequency, and

using said analog voltages to produce a time compressed equivalent of said input signals.

8. A communication method according to any one of claims 1 to 7, wherein said modified transmission signal is decoded by demultiplexing means and time expansion means in the signal path between said broadcast receiver and a speaker thereof.

9. A communication method whereby entertainment generated from a broadcasted signal may at intervals between entertainment items include a selected one of a plurality of simultaneously transmitted communication signals, the method including:-

forming a modified entertainment transmission signal by,

a] arranging a plurality of individual communication signals into discrete time slots;

b] providing said discrete time slots with a synchronizing code identifying the individual communication signal;

c] sequentially combining said discrete time slots into a multiplexed communication signal, and

d] slotting said multiplexed message signal into the intervals between entertainment items to form a modified entertainment signal;

transmitting the modified entertainment transmission signal;

receiving the modified entertainment transmission signal, and generating the broadcast signal by,

a] identifying the discrete time slots in said multiplexed communication signal having a synchronizing code of an individual communication to be broadcast with said entertainment;

b] combining the signals in said identified discrete time slots to form an individual communication signal, and

c] combining said individual communication signal with an entertainment signal to generate the broadcast signal.

10. A communication method whereby entertainment generated from a broadcasted signal may at intervals between entertainment items include a selected one of a plurality of simultaneously transmitted communication signals, the method including:-

forming an entertainment transmission signal;

compressing individual communication signals;

sequentially combining said compressed communication signals and said entertainment transmission signal at selected intervals to form a multiplexed modified entertainment transmission signal;

transmitting the modified entertainment transmission signal;

receiving the modified entertainment transmission signal, and

generating the broadcast signal by expanding the multiplexed signal in said intervals, and broadcasting the entertainment signal and a selected one of the expanded communication signals in said intervals between entertainment items.

11. Broadcasting receiving apparatus for use in a communication method as defined in any one of claims 5 to 8, including demultiplexing means and time expansion means in the signal path between said broadcast receiver and a speaker thereof.

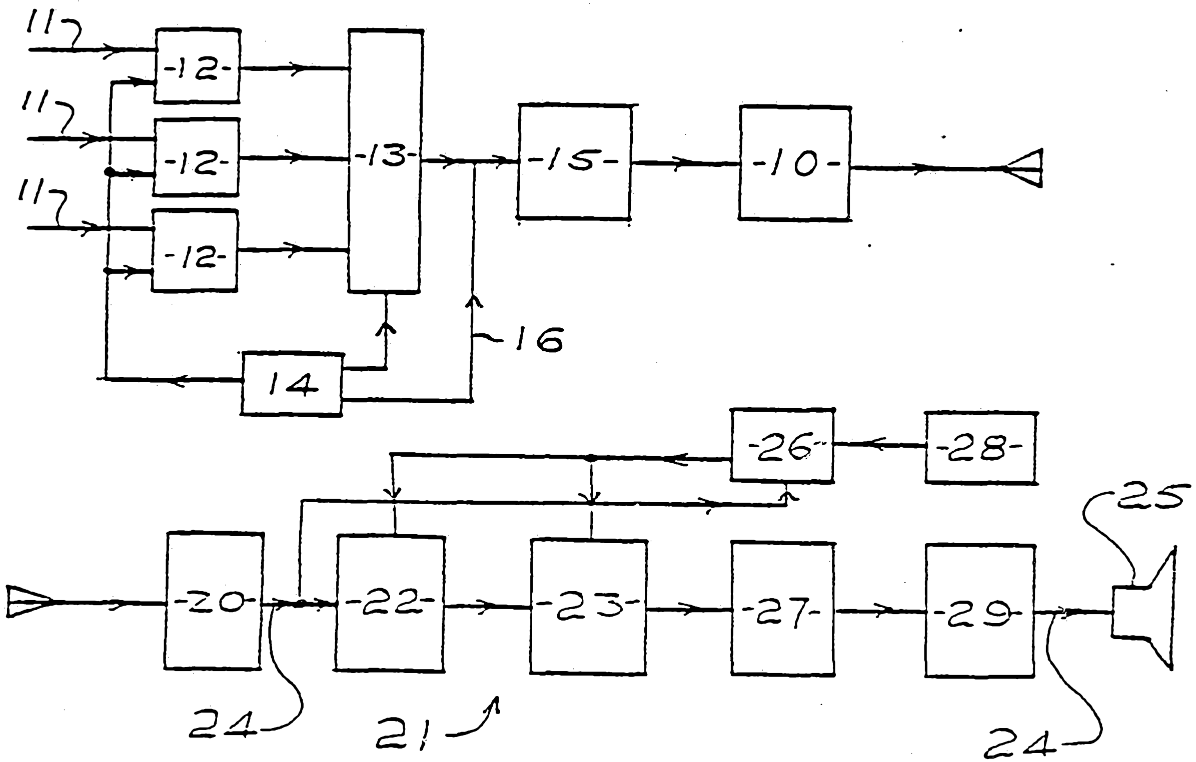
12. Broadcasting receiving apparatus according to claim 11, wherein the transmission receiving means is a standard radio receiver and the decoding means is arranged in the external connections between the standard receiver and its associated speaker assembly.

DATED THIS second DAY OF January, 1991.

ROSS NOEL McGEE

by

PIZZEY & COMPANY PATENT ATTORNEYS



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