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(54) **PUBLIC ADDRESS APPARATUS**

BESCHALLUNGSANLAGE

SYSTEME DE HAUT-PARLEURS

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Description

[0001] The present invention relates to public address apparatus and more particularly but not exclusively to such apparatus when used as a fire alarm.

[0002] It is a requirement of many public address systems that members of the public should be able to hear voice messages rather than just audible signals. However, if a member of the public can hear messages for two spaced-apart sources at the same time it is possible for the message from one source to be heard at a slightly different time to the same message from the other source in which case the message is difficult to hear and understand. This is particularly true of large areas where the sound sources are located at some distance from each other and from a central control unit which is transmitting the message.

[0003] US-A-3858195 discloses an alarm control system corresponding to a plurality of condition sensors to reproduce appropriate messages stored on tape through a paging system. Here, the message to be reproduced is selected by energising a track changing mechanism for a length of time corresponding to selection of the desired track.

[0004] The present invention provides a public address system comprising a control unit and a plurality of sounders, wherein the control unit has a plurality of inputs for receiving signals indicative of different conditions and signal generating means for supplying to the sounders a data signal the duration of which is determined by which control unit input receives the signal; and each sounder includes apparatus for playing pre-recorded messages comprising means for storing a plurality of pre-recorded messages, a data input for receiving said data signal from the control unit and signal discriminating means arranged to monitor the data input to detect a synchronisation pulse and the end of said data signal to determine the duration of the data signal, the duration of the data signal indicating which pre-recorded message is to be played.

[0005] Thus, the present invention provides a synchronising arrangement whereby the sound output from a plurality of sound output from a plurality of sound sources is synchronised. This is achieved by sending a synchronising signal followed by a further signal indicative of a message, e.g. voice, to be played, the further signal being spaced from the synchronising signal by a predetermined period of time.

[0006] By varying the predetermined period of time, different voice messages can be indicated.

[0007] In a preferred embodiment, the signal discriminating means is preferably arranged to detect the end of a single pulse or two pulses following the synchronisation pulse. This allows for an extended number of message sets, allowing for a greater number of different pre-recorded messages to be indicated.

[0008] As each public address sounder stores the plurality of pre-recorded messages independently from the other sounders, and is responsive only to the synchronisation pulse and the further signal indicative of the pre-recorded message to be played, it is possible for the sounder to immediately play the pre-recorded message at the appropriate time as indicated by the synchronisation pulse received.

[0009] By transmitting a control signal indicative of the message to be played rather than a signal containing the message to be played itself, synchronisation between which message each sounder plays and at what time can be ensured.

[0010] It is a further feature of the present invention that each sounder can be set to play a default message if no control signal is received from the control unit within a predetermined amount of time. This has the advantage that in an emergency situation where the control unit may be damaged and the sounders may still operate to alert members of the public to the emergency situation.

[0011] In order that the present invention be more readily understood, an embodiment thereof will now be described by way of example with reference to the accompanying drawings in which:-

Fig. 1 is a diagrammatic view of public address apparatus according to the present invention;
Fig. 2 is a flow chart for explaining the operation of a part of the apparatus shown in Fig. 1;
Fig. 3 is a pulse waveform diagram of a pulse signal generated by the part of the apparatus described in relation to Fig. 2;
Fig. 4 shows a further embodiment of a pulse waveform diagram of a pulse signal generated by the part of the apparatus described in relation to Fig. 2; and
Fig. 5 is a flow chart explaining the operation of another part of the application shown in Fig. 1.

[0012] The preferred embodiment of the present invention will be described in relation to its use as a fire alarm. In this application, a person in any area should be able to hear messages from at least two message sources simultaneously. This is to ensure that the message will still be heard even if one source is faulty for any reason.

[0013] As shown in Fig. 1, a main control unit 10 is arranged to control the operation of a number of sounder units 11. In this embodiment, the sounder units are connected together in two groups with the units in each group connected in series. It is preferred that the units perform a dual sound function of being capable of emitting warning sounds as well as being the source of voice messages.

[0014] Each unit 11 is provided with a control circuit and a memory device for storing signals indicative of one or more voice messages which are to be played by the unit.

[0015] The control unit 10 is arranged to send control signals to the sounder units so that they will transmit the,

or a selected, message at the appropriate time and how this is achieved will now be described with reference to Fig. 2.

[0016] The control unit 10 is a microprocessor controlled device which receives an input from one or more detectors 14 such as heat or smoke detectors or fire alarm buttons. In this embodiment it is assumed that the unit 10 will be able to discriminate between the following four conditions:

a) test;
b) alert;
c) fire;
d) clear.

[0017] As indicated in Fig. 2, after power up, the unit 10 goes through a set up procedure as indicated at State 1 and once set up scans its input or inputs as indicated at State 2. The input or inputs are continually scanned until an appropriate signal or signals is received whereupon the unit 10 will proceed through State 3, or through States 3 to N to determine which condition has been indicated. Depending upon the condition detected by State 3, 4 or up to N a signal will be sent to a pulse generator circuit as indicated at State 7 where a control pulse signal will be generated. The signal is formed from a combination of pulses to produce a waveform as shown in Fig. 3. The waveform is produced by a calibration or synch pulse of fixed, predetermined duration e. g. 20 millisecs. This calibration pulse is followed by an identification pulse whose duration is indicative of the message to be played. The duration of the identification pulse is preferably an integer multiple of the duration of the calibration pulse and is followed by a gap of predetermined duration e.g. a function of the duration of the calibration pulse such as one half.

[0018] After the waveform shown in Fig. 3 is produced, it is transmitted to the sounder units 11 as will be described later. There is a delay before a further waveform can be sent as indicated at State 8 in Fig. 2.

[0019] After the delay at State 8, the unit 10 scans its inputs again and if appropriate detects a "clear" condition as at State N and causes the appropriate waveform to be constructed and sent to the sounder units 11.

[0020] It will be appreciated that certain conditions may be more critical than others and so it is possible for the control unit to change the message being played even if two different inputs are being received. This would enable a "fire" input to take priority over any other input.

[0021] The apparatus shown in Fig. 2 can be modified to produce a modified form of the waveform shown in Fig. 3. The modified waveform is shown in Fig. 4. A fourth pulse, nominally starting at a minimum of 20 msecs from the third pulse, enables many more message sets to be catered for. Extended message set I would have a pulse inserted a predetermined period e. g. 20 msecs after the third pulse. Extended message set 2 at 30 msecs after the third pulse and so on up to message set N. Sounder units only able to interpret 3 pulses as shown in Fig. 3 will ignore the fourth pulse as a rogue pulse.

[0022] At each sounder unit 11 there is a microprocessor controlled message system which receives the waveform signals from the control unit 10, determines which voice message to play and causes the message to be played. This will now be described with reference to Fig. 5.

[0023] On initial power up, the microprocessor executes a set up procedure and ignores signals on its input for a predetermined period of time e.g. 250 msec. in order to avoid false triggering of the sounder unit. After this predetermined period of time, the input is monitored as indicated at State 2. If there is data on the input to the sounder unit, the microprocessor looks for the calibration pulse at State 3 and if this is present then moves to State 4 where the succeeding pulse length(s) is monitored and if determined to be one of the predetermined lengths e.g. 20, 40, 60 80 msec, or including an extended message set pulse, this causes the microprocessor to initiate the playing of the appropriate message. After the message has been played, the microprocessor returns to State 2 and monitors the input to the sounder for a data signal.

[0024] A further state 6 is also possible, wherein if the microprocessor has not received a signal on its input for a predetermined amount of time, indicating that the central control unit 10 may have been damaged, then a default message can be set to play to alert members of the public. In this case, as each sounder is operating independently from the central control unit, and hence from each other, it is unlikely that synchronisation will be maintained between each sounder, but the advantage is obtained that the public address system will continue to operate, even though it may have sustained critical damage.

Claims

1. A public address system comprising a control unit (10) and a plurality of sounders (11), wherein the control unit has a plurality of inputs for receiving signals indicative of different conditions and signal generating means for supplying to the sounders a data signal the duration of which is determined by which control unit input receives the indicative signal; and each sounder (11) includes apparatus for playing pre-recorded messages comprising means for storing a plurality of pre-recorded messages, a data input for receiving said data signal from the control unit (10) and signal discriminating means arranged to monitor the data input to detect a synchronisation pulse and the end of said data signal to determine the duration of the data signal, the duration of the data signal indicating which pre-recorded

message is to be played.

2. A system as claimed in claim 1 wherein the signal discriminating means is arranged to detect the end of a single pulse or two pulses following the synchronisation pulse.

3. A system as claimed in claim 1 or 2 in which each sounder is arranged to play a default message if no control signal is received from the control unit within a predetermined amount of time.

4. A system claimed in claim 1, 2 or 3 in which the control unit is arranged to give priority to some inputs over others in the event of more than one input receiving a signal.

Patentansprüche

1. Beschallungsanlage, die eine Steuereinheit (10) und eine Vielzahl akustischer Signalgeber (11) umfasst, wobei die Steuereinheit eine Vielzahl von Eingängen zum Empfangen von Signalen, die verschiedene Zustände anzeigen, und eine Signalerzeugungseinrichtung aufweist, die den akustischen Signalgebern ein Datensignal zuführt, dessen Dauer dadurch bestimmt wird, welcher Eingang der Steuereinheit das anzeigende Signal empfängt, und jeder akustische Signalgeber (11) eine Vorrichtung zum Abspielen voraufgezeichneter Mitteilungen enthält, die eine Einrichtung zum Speichern einer Vielzahl voraufgezeichneter Mitteilungen, einen Dateneingang zum Empfangen des Datensignals von der Steuereinheit (10) und eine Signalunterscheidungseinrichtung umfasst, die so eingerichtet ist, dass sie den Dateneingang überwacht, um einen Synchronisationsimpuls und das Ende des Datensignals zu erfassen und so die Dauer des Datensignals zu bestimmen, wobei die Dauer des Datensignals anzeigt, welche voraufgezeichnete Mitteilung abzuspielen ist.

2. System nach Anspruch 1, wobei die Signalunterscheidungseinrichtung so eingerichtet ist, dass sie das Ende eines einzelnen Impulses oder zweier Impulse erfasst, die auf den Synchronisationsimpuls folgen.

3. System nach Anspruch 1 oder 2, wobei jeder akustische Signalgeber so eingerichtet ist, dass er eine Standardmitteilung abspielt, wenn innerhalb eines vorgegebenen Zeitraums kein Steuersignal von der Steuereinheit empfangen wird.

4. System nach Anspruch 1, 2 oder 3, wobei die Steuereinheit so eingerichtet ist, dass sie, wenn mehr als ein Eingang ein Signal empfängt, einigen Eingängen gegenüber anderen Priorität einräumt.

Revendications

1. Système de diffusion publique comprenant une unité de commande (10) et une pluralité de générateurs de sons (11), dans lequel l'unité de commande a une pluralité d'entrées pour recevoir des signaux indiquant des conditions différentes et des moyens de génération de signal pour fournir aux générateurs de sons un signal de données dont la durée est déterminée par l'entrée de l'unité de commande qui reçoit le signal indicatif; et chaque générateur de sons (11) comprend un appareil pour reproduire des messages préenregistrés comprenant des moyens de mémorisation d'une pluralité de messages préenregistrés, une entrée de données pour recevoir ledit signal de données de l'unité de commande (10) et des moyens de différenciation de signal adaptés pour surveiller l'entrée de données pour détecter une impulsion de synchronisation et la fin dudit signal de données pour déterminer la durée du signal de données, la durée du signal de données indiquant quel message préenregistré doit être reproduit.

2. Système selon la revendication 1 dans lequel les moyens de différenciation de signal sont adaptés pour détecter la fin d'une impulsion unique ou de deux impulsions suite à l'impulsion de synchronisation.

3. Système selon la revendication 1 ou 2 dans lequel chaque générateur de sonde est adapté pour reproduire un message par défaut si aucun signal de commande n'est reçu de l'unité de commande dans un délai prédéterminé.

4. Système selon la revendication 1, 2 ou 3 dans lequel l'unité de commande est adaptée pour donner la priorité à des entrées sur d'autres dans le cas où plus d'une entrée reçoit un signal.

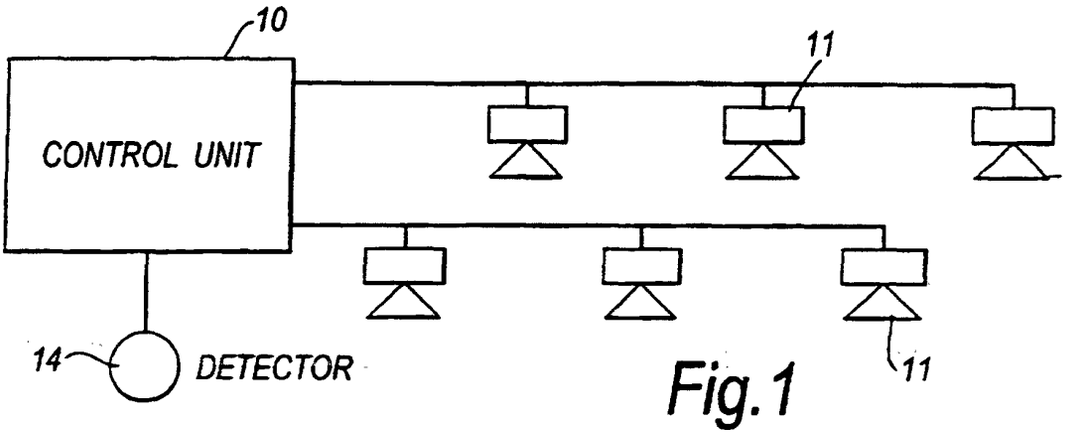
10
11
CONTROL UNIT
14
DETECTOR
11

Fig.1

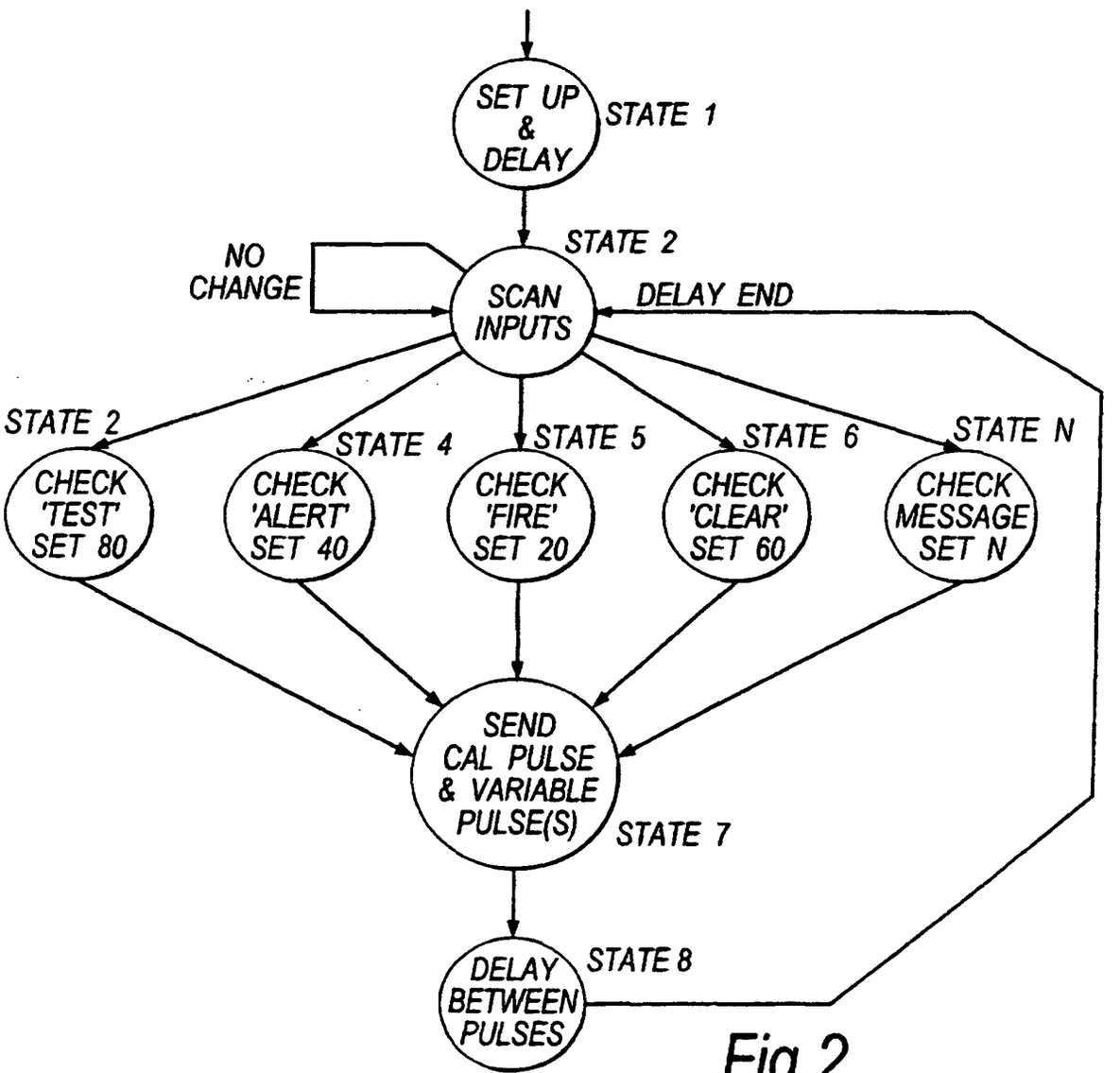
SET UP & DELAY
STATE 1
STATE 2
NO CHANGE
SCAN INPUTS
DELAY END
STATE 2
STATE 4
STATE 5
STATE 6
STATE N
CHECK 'TEST' SET 80
CHECK 'ALERT' SET 40
CHECK 'FIRE' SET 20
CHECK 'CLEAR' SET 60
CHECK MESSAGE SET N
SEND CAL PULSE & VARIABLE PULSE(S)
STATE 7
DELAY BETWEEN PULSES
STATE 8

Fig.2

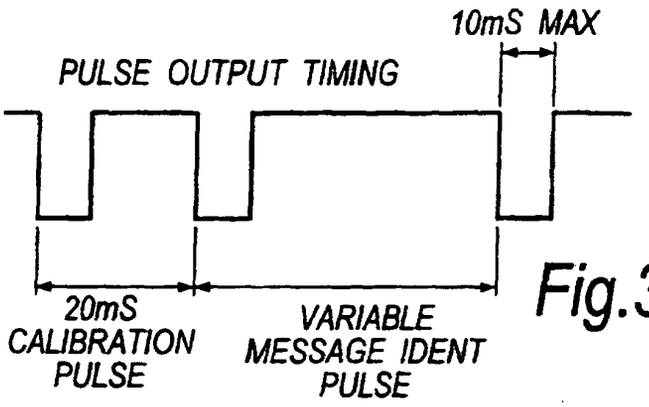

Fig.3

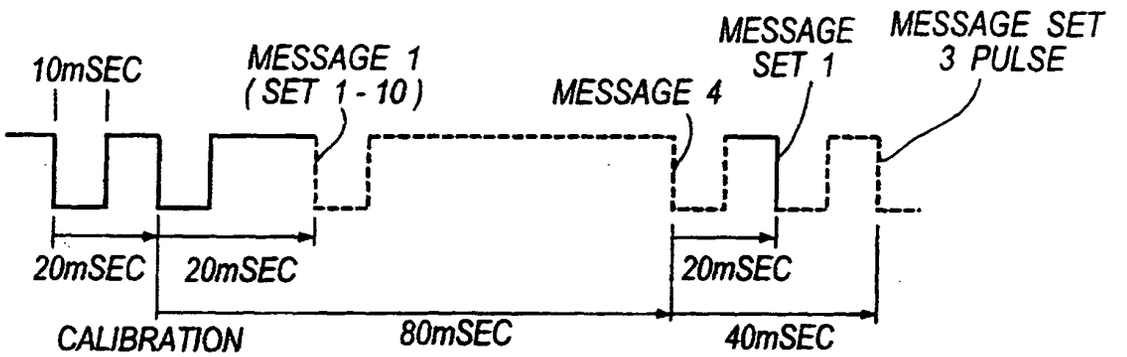

Fig.4

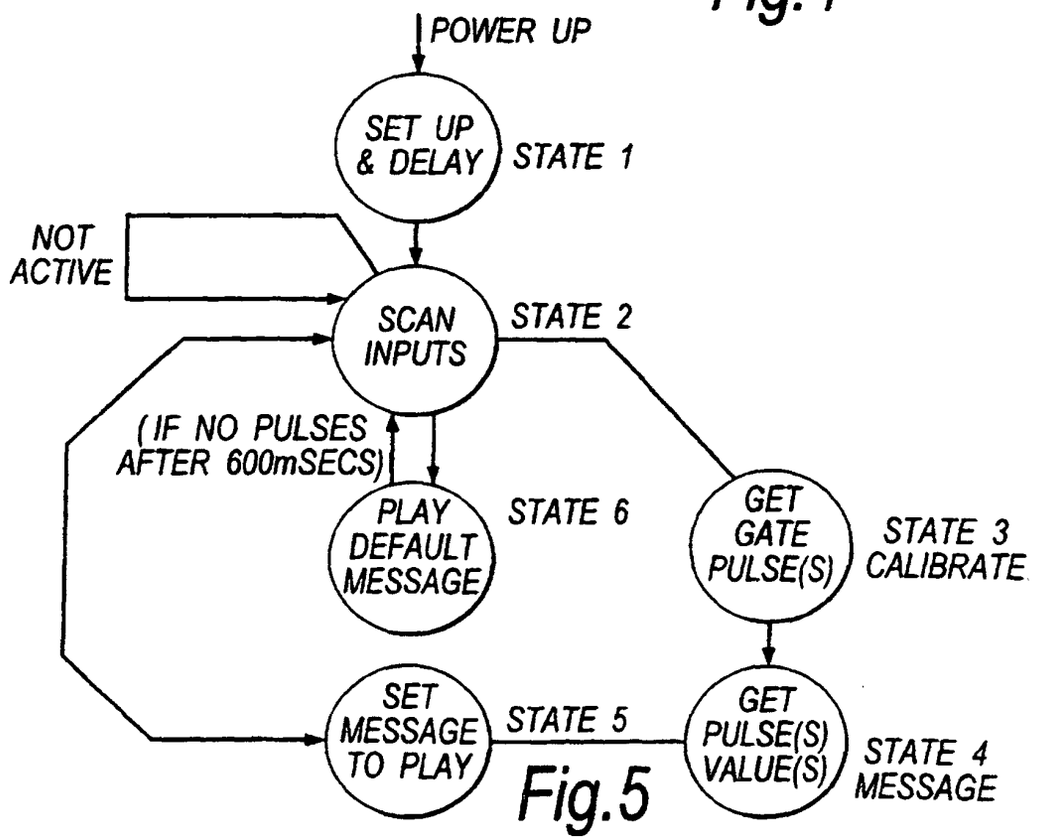

Fig.5