

1 585 384

- (21) Application No. 26400/77 (22) Filed 23 June 1977 (19)
 (31) Convention Application No. 699 433 (32) Filed 24 June 1976 in
 (33) United States of America (US)
 (44) Complete Specification published 4 March 1981
 (51) INT. CL.³ G11B 23/04
 (52) Index at acceptance

G5R B11 B264 B37Y B38Y B421 B436 B444 B55X B60X
 B682 B687 B785 B83X



(54) REAL TIME CONVERSATIONAL TOY HAVING SECURE
 PLAYBACK RESPONSE

- (71) I, MICHAEL J. FREEMAN, a citizen of the United States of America, of 12 Maplewood Road, Hartsdale, New York, New York 10530, United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- The present invention relates to a recorded information playback device which when used as a toy in a play situation has the capability of controlling a real time conversational verbal interaction, it being capable of providing an appropriate response to a selection made in response to an interrogatory message from a removably insertable magnetic storage medium.
- Verbal interactive apparatus for providing playback responses from removably insertable magnetic recording media are well known, for example the real time conversational student response teaching apparatus described in U. S. Patent No. 3,947,972. Under certain circumstances, it is desirable to ensure that only properly authorized tapes may be played on a particular verbal interactive playback response apparatus, one such exemplary instance being where the verbal interactive apparatus is rented on a subscription or "pay-for-play" basis and another such exemplary instance being where the verbal interactive playback device is only properly operable to provide a real time conversational response when the storage medium contains a predetermined unique recording format, such as the type of format described in the aforementioned U. S. Patent No. 3,947,972. Some prior art attempts to provide security for playback of such magnetically recorded storage media or tapes have primarily concentrated on putting some type of sense marking or code on the tape itself. However, this approach has resulted, at times, in distortion of the tape as well as potential problems in properly sensing such codes under erroneous playback conditions, such as due to wow and flutter. In addition, if such playback security is desired in a relatively inexpensive toy, then sophisticated security systems cannot economically be utilized as their cost may well exceed the cost of the playback device itself. Moreover, although the verbal interactive apparatus disclosed in U.S. Patent No. 3,947,972 is quite satisfactory for use in a student response teaching environment, such as the classroom, the sophistication thereof is not normally desired in a toy, because of the economies normally desired in the toy industry. However a less sophisticated apparatus having the same overall outward conversational response type of effect is not presently available in the prior art to the knowledge of the inventor herein. These disadvantages of the prior art are overcome by the present invention. Accordingly the invention provides a recorded information playback device incorporating a removable housing containing a magnetic storage medium on which there is defined a plurality of co-extensive recording tracks, each track storing audio information for playback therefrom in a succession of consecutive discrete information segments, corresponding segments in said tracks having coincident starts and finishes, receptacle means for releasably receiving said housing with the storage medium in a playback position in respect thereof, playback means adjacent to the receptacle means and in alignment with the magnetic storage medium for selective playback of the stored audio information from any of said co-extensive tracks, selection means operatively connected to the playback means the operation of which causes the direct selection of one of the tracks and the continuous reproduction of the selected information stored thereon in accordance with programmed variable choices, an audio output means operatively connected to the playback means and the selection means for directly reproducing the information stored on the selected track, and security

means associated with the receptacle means and the removable housing which disables the playback means upon insertion of the removable housing into the receptacle means unless an insertion condition required by the receptacle means is satisfied by the said removable housing, wherein at least one of said tracks stores information which when reproduced has in real time a conversational form which spans a plurality of consecutive segments some of which comprise discrete interrogatory messages while at least some of the other tracks store information in respective segments thereof comprising selectable complete messages responsive to choices made by the operator in respect of said interrogatory messages, which responsive messages are sequentially related in real time to respective interrogatory messages, said selection means comprising means for designating only one of said tracks as an interrogatory message track and for designating said other of said tracks as responsive message tracks, there being a real time relationship between adjacent successive interrogatory messages solely dependent upon the relationship between said interrogatory messages on said one designated interrogatory message track and said respective responsive messages on said other tracks, said selection means thereby varying said responsive message in accordance with the selection made by the operator in his choice of response to the respective interrogatory message, whereby said device is capable of controlling in an apparent verbal interaction a response in real time by an operator to an interrogatory message, which response is contained by a predetermined category of responses, each said choice corresponding to a different response in said category of responses and wherein said security means comprises a playback authorisation code in the form of predetermined physical characteristics provided on said removable housing and detection means associated with said receptacle means for detecting the presence in said housing of the said predetermined physical characteristics.

Some of the aforesaid features of the invention also form the subject matter of my copending application 26401/77 (Serial No. 1,585,385) to which the reader's attention is hereby directed.

In the preferred arrangement multiple selection means, such as a plurality of switches with one such switch being associated with each of the plurality of audio tracks, are operatively connected to the playback means for directly selecting one of the tracks for reproducing the selected information stored thereon in accordance with a predetermined purpose for the multipurpose audio track. The switches may comprise a

parallel connected switch bank having a separately operable switch member for each of the multiple purposes which may be designated by indicia or labels on a removable template removably mountable on the robot-like housing. A mechanical interlock is provided for ensuring that only one of the switch members and, correspondingly, only one of the plurality of switches, may be operable at a time for enabling the direct selection of the associated track dependent on the predetermined purpose, such purpose being defined in the interrogatory message. The removable template is preferably provided along with the multitrack storage medium for ensuring that the proper indicia are designated for the various switches and switch members comprising the multiple selection means.

Audio output means, such as a single channel audio amplifier when a single track playback head is used and a multichannel audio amplifier when a multitrack playback head is used, is operatively connected to the playback means and the direct selection means for directly providing the track information from the selected track for reproducing the information as an audio output therefrom. Information is stored on each track in a plurality of reproducible information segments. Most preferably, each basic interrogatory message is identically contained in each of the tracks but one of the tracks is designated the primary interrogatory message or question track while the other tracks contain also messages which are responsive to the selection made by the user of the device in response to an interrogatory message. These other tracks are therefore called responsive message tracks.

In addition, at least one of the responsive message tracks may contain additional descriptive information relating to the selection made by the user in response to an interrogatory message. In such an instance, the primary interrogatory message track may at the same point contain an additional interrogatory message unrelated in content to the additional information contained in the said at least one responsive message track. The other responsive message tracks would in these circumstances and at a subsequent point again contain responsive messages related in content to the additional interrogatory message but unrelated in content to the said additional information. This feature is known as the "more information" feature. For example, if a particular interrogatory message initially involves a multiple choice selection of any one of the responsive message tracks, and "more information" is provided by selecting a particular track, then the next successive interrogatory message will be the type of question requiring TRUE/FALSE or YES/NO answers, and

will require a response involving only the responsive message tracks which do not have the "more information" contained thereon. The arrangement of information in the tracks is such that all of the tracks contain the next subsequent interrogatory message at the same point.

The aforementioned removably insertable magnetic storage medium may be a reel-to-reel type cassette. The device includes a playback security system comprising security means operatively associated with the receptacle means to prevent unauthorized use of the device. The security means controllably enables the provision of the selected playback response from the multitrack storage medium. Preferably the storage medium housing has means disposed thereon comprising an authorization code for playback of the storage medium, such as an optically readable code from which a corresponding digital signal may be provided. The security means comprises means responsive to the playback authorization code, such as an illumination source (e.g. a plurality of light emitting diodes) and a photodetector matrix array (e.g. a plurality of photo transistors). The optically readable authorization code provided on the housing comprises a plurality of light transmitting passageways in the housing which when the latter is inserted in the device is arranged between the illumination source and the photodetector matrix array in optical registration therewith enables selective illumination of the photodetector matrix array for providing a corresponding digital signal. If desired, light transmitting optical fibres may be utilized with each one of the fibres being optically registrable with a given one of the passageways for illuminating a given one of the photodetectors in the array. The playback means, such as the tape drive, audio amplifier and magnetic playback head, have an enable condition and a disable condition for enabling the provision of the selected playback response recorded on the multitrack magnetic storage medium therefrom only in the enable condition thereof. The condition responsive means may preferably include a logic gating network, such as an AND gate operatively connected to receive the digital signal information corresponding to the predetermined authorization code for providing a first authorization logic output condition when this information corresponds to the predetermined authorization code, an OR gate operatively connected to receive the digital signal information corresponding to an unauthorized playback code for providing a first state output condition when it corresponds to this unauthorized code and a second state output condition when it does not correspond to this unauthorized code, a logic inverter operatively connected to the output of the

OR gate for inverting the state output condition thereof for providing a second authorization logic output condition therefrom only when the second state output condition is provided thereto from the OR gate, and another AND gate operatively connected to the previous AND gate and OR gate outputs for providing the enable condition solely when the first and second authorization logic output conditions are present. This logic gating network is responsive to the aforesaid digital signal for providing the enable condition to the playback means only when the insertion condition corresponds to a predetermined playback authorization code. Preferably, the device includes a self-contained power source, for providing power thereto, which is connected to operate the device only when the latter is in an enabled condition. This enable condition providing means may comprise a transistor switch operatively connected to the aforementioned AND gate output which provides the enable condition therefrom for providing the enable condition solely when the first and second authorization logic output conditions are present.

The aforementioned security system may also be achieved by employing means disposed on the cassette housing having passageways therein which are registrable with pins insertable therethrough when the proper passageway configuration or authorization code is provided, thereby placing the cassette housing in the aforementioned playback position. In such an instance, a switch activation means is provided which co-operates with a spring-biased micro-switch, which switch is normally biased to the disable condition, for closing the microswitch to provide the enable condition. This micro-switch, in such an instance, is preferably connected between the aforementioned power supply and the playback means to control the provision of power thereto.

The invention will now be described by way of example, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is an illustration, partially in schematic and partially in block, of one embodiment of the device of the present invention,

Figure 2 is a rear view of a preferred receptacle means containing a reel-to-reel tape cassette,

Figure 3 is a diagrammatic illustration, similar to Figure 2, of an alternative arrangement of the receptacle means of the present invention,

Figure 4 is a diagrammatic illustration of an alternative condition responsive portion of the embodiment of the present invention illustrated in Figure 1,

Figure 5 is a diagrammatic illustration of

a complete alternative arrangement of the playback security system of the embodiment of the present invention illustrated in Figure 1 showing a preferred reel-to-reel cassette, in a side view thereof, in position,

Figure 6 is a diagrammatic illustration of the preferred receptacle means of the embodiment of the invention having the arrangement of Figure 5, the cassette being shown, in front view, inserted therein,

Figure 7 is a logic schematic diagram, partially in block, of the playback security system illustrated in the arrangement of Figure 2,

Figure 8 is an illustration, similar to Figure 1, of another embodiment of the device according to the present invention,

Figure 9 is an illustration of the mechanical arrangement of selection buttons associated with the device shown in Figure 8,

Figure 10 is a front elevational view of a preferred robot-like housing for the devices of Figure 1, 8 or 9,

Figures 11 and 12 are diagrammatic illustrations of a further playback security system arranged for use in the robot-like housing of Figure 10,

Figure 13 is a diagrammatic illustration of an alternative template for use with the robot-like housings of Figures 10 and 14,

Figure 14 is a front elevational view of a robot-like housing for use with the device in accordance with the present invention, employing the receptacle means of Figure 6 or Figure 17,

Figure 15 is a side elevational view of the reel-to-reel cassette shown in either Figure 2 or Figure 3,

Figure 16 is a rear elevational view of the reel-to-reel cassette shown in Figures 5 and 6,

Figure 17 is a diagrammatic illustration, similar to Figure 6, of receptacle means, illustrating the cassette shown in Figures 2 or 3 and 15 in front view thereof, inserted therein, and

Figure 18 is a diagrammatic illustration of a series circuit electrical interlock portion of the playback security system shown in Figures 11 and 12.

Referring now to the drawings in detail and initially to Figure 1 thereof, a first embodiment 20 of the device of the present invention for providing a conversational type playback response from a removably insertable magnetic storage medium, the apparatus generally being referred to by the reference numeral 20, is shown. An alternative embodiment 20a of the device is shown in Figure 8 and shall be described subsequently with reference thereto. The apparatus 20 illustrated in Figure 1 preferably provides a toy capable of providing a conversational type of verbal response to actions taken by the user and is similar in this respect to the

apparatus described in United States Patent No. 3,947,972. The apparatus may be housed in a robot-like housing, such as the type 22 illustrated in Figure 10, or the type 22a illustrated in Figure 14, as will be described in greater detail hereinafter. The toy apparatus 20 conventionally employs a magnetic storage medium, such as a multitrack magnetic tape 24 in a reel-to-reel tape cassette housing 26 (Figures 2, 3, 5, 6, 15, 16, 17) for conventional capstan drive thereof. The tape 24 is conventionally stored in cassette housing 26 between a storage reel 27 and a take-up reel 29 with a conventional window 31 being provided at one portion of the housing 26 for enabling operative engagement therewith with a conventional multitrack magnetic playback head 34. A conventional pressure roller 28 and capstan 30 which are driven by a conventional motor drive 32 are illustratively shown in Figure 1 for providing the aforementioned conventional capstan drive of the multitrack magnetic tape 24. As will be described in greater detail hereinafter, the conventional multitrack magnetic playback head 34 selectively plays back the information stored on a given one of the multiple audio tracks on tape 24. Four such tracks labelled A, B, C and D are illustratively shown in Figure 1, and with track D thereof being termed the question or interrogatory track, as will be described in greater detail hereinafter, because of the nature of the information stored thereon. Although the lowermost track, track D is illustratively shown as the question track, any of the tracks A—D could be designated as the question track if desired. Moreover, as will further be described in greater detail hereinafter, the information is stored on the tracks of the magnetic tape 24 in a plurality of reproducible information segments, each of which comprises a complete message which is reproducible directly in response to the selection of the track upon which the segments are stored. The extent of the segments are illustratively represented in Figures 1, 8 and 9 by the spacing between a pair of solid vertical lines on a given track. This is similar to the manner of operation of the conversational student response teaching apparatus described in United States Patent No. 3,947,972.

In order to provide playback of the information magnetically stored on tape 24, a conventional four channel audio amplifier 36 is provided which is operatively connected to playback head 34 as shown in Figure 1 or a conventional single channel audio amplifier 36a is utilized with a conventional single track magnetic playback head 34a which is mechanically shifted from track to track as shown in Figures 8 and 9. The four channel audio amplifier 36 prefer-

ably has one channel for each of the four tracks A, B, C and D in the example shown in Figure 1 so as to conventionally playback the information stored on the respective audio track selected. The output of audio amplifier 36 is preferably connected to a multiple choice selection device 38, to be described in greater detail hereinafter, which comprises a plurality of conventional switches 40, 42, 44, 46, 48, 50, 52, 54 and 56 with at least one switch being provided for each channel or track of multitrack audio tape 24. In the example shown in Figure 1, switch 40 is associated with the question track or track D, switches 42, 44 and 46, which comprise a multiple selection switch, are connected in parallel and are associated with track A, switches 48, 50 and 52, which comprise another multiple selection switch, are connected in parallel and are associated with track B, and switches 54 and 56, which comprise still another multiple selection switch, are connected in parallel and are associated with track C. Each of the aforementioned switches 40 through 56, inclusive, is connected to the appropriate channel output of audio amplifier 36. These switches are conventional push button switches having a mechanical interlock therebetween, such as will be described in greater detail with reference to Figure 9, so that only one switch may be closed at a time, the switch being latched in the closed position when depressed and released when another switch in the group is depressed. The aforementioned switches 40 through 56, inclusive, are connected between the output of the audio amplifier 36 and a conventional audio output device, such as a loudspeaker 58 or a pair of earphones 60 through a volume control 62, such as a rheostat, and therefrom back to the audio amplifier 36 to complete the circuit.

As is shown in Figure 1, a power supply 64, operated from either an a.c. or d.c. source, depending on the desired operating conditions of the apparatus 20, is provided for supplying power to operate the motor 32, the audio amplifier 36 and the units of the apparatus 34-58-60-62-38. As presently preferred, a d.c. powered supply is preferable when the apparatus 20 comprises a toy since it will then have one of the normally desired toy attributes of portability. Assuming that the audio amplifier 36 and the tape drive 28-30-32 have power supplied thereto, when any one of the switches 40 through 56, inclusive, is closed, the output of the corresponding audio track A, B, C or D, all of which are being provided to audio amplifier 16 by multitrack playback head 34, is selectively provided to the audio output device 58 or 60 to be heard by the user. An on/off switch 66 is also provided for enabling the user to turn the apparatus 20 on or

off. However, as shown in Figure 1, the apparatus 20 also includes a playback security apparatus or retrieval media security system 68 (to be described in greater detail hereinafter with respect to Figures 2-7, 9-12 and 14-17) which is operatively connected at points 70 and 72 between the audio amplifier 36 and the power supply 64 in Figure 1, or the audio amplifier 36a and power supply 64 in Figure 8, so as to enable the provision of power to the apparatus 20 (Figure 1) or 20a (Figure 8) solely when the inserted tape cassette housing 26 provides the correct authorization code. Detection of this code provides an enable condition which completes the circuit between points 70 and 72. Thus, as will be described in greater detail hereinafter, even if on/off switch 66 is closed, the apparatus 20 or 20a will not operate unless the authorization code has been detected by the playback security system 68 so as to enable the completion of the circuit between points 70 and 72.

Before describing the apparatus 20 and its operation in any greater detail, the playback security system 68 employed therein shall now be described in greater detail hereinafter, initially with reference to Figures 2, 7, 14, 15 and 17. Referring initially to Figures 2, 14, 15 and 17, the preferred tape cassette housing 26, which is shown in a rear view thereof in Figure 2, includes an upstanding portion 74 having a plurality of passageways, with four such passageways 76, 78, 80 and 82 being illustratively shown in the embodiment of Figures 2, 7, 15 and 17, arranged in a predetermined pattern for providing a predetermined playback authorization code associated with the storage media or multitrack tape 24 contained within the cassette housing 26. As will be described in greater detail hereinafter, this authorization code provided via passageways 76, 78, 80 and 82 is an optically readable code. In such an instance, the playback security system 68 includes a portion 84 which is insertable in the apparatus and called hereinafter the "insertion security portion" which is responsive to the optically readable playback authorization code for providing a first enabled condition therefrom, and a portion 86, such as a condition responsive logic network and called hereinafter the "condition responsive portion", which is operatively associated with the insertion security portion 84 to provide a second enabled condition when the insertion security portion is inserted in the apparatus, as will be described in greater detail hereinafter with reference to Figure 7. Thereby, the provisions of the playback response from the multitrack tape 24 is controllably enabled in response to the detection of the playback authorization code following insertion of the tape cassette housing 26.

The insertion security portion 84 includes an illumination source 88 and a photodetector matrix array 90 with the tape cassette housing 26 being removably insertable into a keyway 92 (Figures 14 and 17) in the housing 22a for the apparatus 20 so that the upstanding portion 74 of cassette housing 26 is disposed between illumination source 88 and photodetector matrix array 90 with the passageways 76, 78, 80 and 82 being in optical registration with the illumination source 88 and photodetector matrix array 90, as illustratively shown in Figure 2. The illumination source 88 comprises a plurality of conventional light emitting diodes, with 13 such light emitting diodes 94 being utilized in the exemplary configuration of Figure 7. In addition, if desired, the illumination source 88 may also comprise an equal plurality of conventional optical fibres or light pipes 96 with one such light pipe 96 being provided for each of the light emitting diodes in optical alignment therewith with the entrance end of the light pipe 96 being adjacent the light emitting diode and with the exit end of the light pipe 96 being adjacent a given position with respect to the upstanding portion 74 so as to transmit light in an optical path transversely across a given path intersected by upstanding portion 74 to an adjacent phototransistor 98 located in the photodetector matrix array 90 which comprises a plurality of conventional phototransistors 98 equal in number to the plurality of light emitting diodes 94 and associated light pipes 96. There is of course at least one light emitting diode-light pipes 94—96 illumination source associated with each of the light transmitting passageways 76, 78, 80 and 82 provided in upstanding portion 74 and one corresponding phototransistor 98 in the photodetector matrix array 90 associated in optical alignment with these illumination sources 94—96 at the opposite end of the corresponding light transmitting passageways 76, 78, 80 and 82 in upstanding portion 74. However, as shown in Figure 7, for added security and in order to attempt to prevent "fooling the system" with unauthorized playback codes, such as by utilizing cassette housings 26 not having an upstanding portion 74 so that all of the illumination provided by illumination source 88 illuminates the complete photodetector matrix array 90, the illumination source 88 and the photodetector matrix array 90 include a plurality of spurious locations which if illuminated by themselves or while the positions associated with the proper predetermined authorization code are also illuminated will provide a disable condition to the apparatus 20, thus keeping the circuit open between points 70 and 72 and preventing the operation of the apparatus 20, such as by disconnecting the power supply

64. As previously mentioned, Figure 7 illustrates the use of a total of 13 photodetectors in the photodetector matrix array comprising four photodetectors 98a, 98b, 98c and 98d (Figure 7) associated in optical alignment with light transmitting passageways 76, 78, 80 and 82 when the cassette housing 26 is received in receptacle 92 with four corresponding light emitting diodes-light pipe illumination sources 94—96 being associated therewith, and nine photodetectors, 98e through 98m, inclusive, associated with nine such spurious positions which spurious position photodetectors 98e through 98m are in optical alignment with nine corresponding light emitting diodes-light pipe illumination sources 94—96. As shown and preferred in Figures 2, 7, 15 and 17, when the cassette housing 26 having the upstanding portion 74 containing the proper or correct predetermined playback authorization code defined by the light passageways 76, 78, 80 and 82 therein is inserted in keyway 92, only photodetectors 98a, 98b, 98c and 98d will be illuminated with the balance of portion 74 serving to block the balance of the optical paths associated with photodetectors 98e through 98m so that these photodetectors will not be illuminated by the corresponding optically aligned illumination sources 94—98.

As shown in Figure 7, the condition responsive logic network 86 portion of the playback security system 68 comprises a pair of conventional AND gates 100 and 102 and, in the example shown in Figure 7, a pair of conventional OR gates 104 and 106 which OR gates 104 and 106 have conventional logic inverters 108 and 110, respectively, connected to the outputs thereof. In addition, a conventional transistor switch 112 is connected to the output of AND gate 102 between points 70 and 72 which switch 112 is normally biased to the open or disable condition providing an open circuit between points 70 and 72 except when an enable signal is provided at the output of AND gate 102 thereby closing transistor switch 112 so as to complete the circuit between points 70 and 72. As shown in Figure 7, the output of AND gate 100 is provided as one input to AND gate 102 via path 114, with the other inputs to AND gate 102 being the output of inverter 108 provided via path 116 and the output of inverter 110 provided via path 118. AND gate 100 is associated solely with the correct predetermined playback authorization code and accordingly the inputs thereto are the outputs of photodetectors 98a, 98b, 98c and 98d provided via paths 120, 122, 124 and 126, respectively. OR gates 104 and 106, on the other hand, are solely associated with the spurious or unauthorized code positions of the photodetector matrix array 90, with OR gate 130

104 having its input connected to the outputs of photodetectors 98e, 98h, 98i, 98l and 98m of array 90 via paths 128, 130, 132, 134 and 136, respectively, and with the inputs of OR gate 106 being connected to the outputs of photodetectors 98f, 98g, 98j and 98k of array 90 via paths 138, 140, 142 and 144, respectively. Of course, if desired, only one such OR gate can be utilized. Moreover, more or less spurious or unauthorized code positions can be provided in the photodetector matrix array 90 depending on the desired level of security to be provided by the playback security system 68 as well as on the desired sophistication of the correct predetermined playback authorization code, which sophistication is dependent on the selected desired pattern of light transmitting passageways for upstanding portion 74.

The playback security system 68 illustrated in Figures 2, 7, 15 and 17 operates in the following manner. When a cassette housing 26 is inserted in keyway 92, with the illumination source 88 and photodetector matrix array 90 being ON, via a power supply therefor as well as for the logic 86 which power supply is not shown, light provided from the illumination source 94-96 strikes or illuminates the various positions defined by the photodetector matrix array 90. In order for AND gate 100 to provide an authorization logic output condition via path 114, which in the example of the logic shown would be a logic one, all of the inputs 120, 122, 124, and 126 thereto must also be logic ones. Thus, photodetectors 98a, 98b, 98c and 98d of array 90 must all be illuminated thereby providing digital signal information comprising the aforementioned logic ones via paths 120, 122, 124 and 126. In such an instance, a logic one is provided as an input to the AND gate 102 via path 114. With respect to OR gates 104 and 106, if the inserted cassette housing 26 contains the correct predetermined playback authorization code via the light passageway arrangement of upstanding portion 74, then none of the spurious position photodetectors 98e through 98m in the photodetector matrix array 98 will be illuminated and correspondingly the outputs thereof will be logic zeros; which digital signal information will thereby be present at the corresponding inputs 128 through 144, inclusive, of OR gates 104 and 106. Since all of the inputs, in this instance, to OR gate 104 will be a logic zero, the output thereof provided via path 150 to the input of inverter 108 will be a logic zero and, similarly, since all of the inputs to OR gate 106, in this instance, will be a logic zero, the output of OR gate 106 via path 152 which is provided to the input to inverter 110 will also be a logic zero. In such an instance, the output of inverter 108 via path 116 will be a logic one and, similarly, in

such an instance, the output of inverter 110 via path 118 will also be a logic one. Thus, the three inputs to AND gate 102 when solely photodetectors 98a, 98b, 98c and 98d are illuminated, indicating that the cassette housing 26 contains the correct predetermined playback authorization code, will all be logic ones resulting in a logic one or enable output from AND gate 102 via path 154 to enable transistor switch 112, thereby closing switch 112 and completing the circuit path between points 70 and 72 as long as such enable output via path 154 is provided to transistor switch 112. However, if an unauthorized playback authorization code is present with respect to the insertion of a cassette housing 26, so that either any one of the photodetectors 98a, 98b, 98c, 98d associated with the correct predetermined playback authorization code is not illuminated or any one of the photodetectors associated with the spurious locations indicative of an unauthorized playback authorization code, namely photodetectors 98e through 98m, are illuminated, then AND gate 102 will not provide an enable output via path 154 to transistor switch 112, thus leaving transistor switch 112 in a disable condition in which the circuit path between points 70 and 72 is open or, if transistor switch 112 had previously been enabled as described above, then, disabling transistor switch 112 so as to reopen the circuit path between points 70 and 72. This will occur because if any one of the inputs 120 through 124 to AND gate 100 is a logic zero, such as will occur if an associated photodetector 98a through 98d is not illuminated, then the output of AND gate 100 via path 114 will not be a logic one but instead will be a logic zero whose presence at one of the inputs of AND gate 102 will prevent the provision of the enable signal via path 154 since the output of AND gate 102 in such an instance, cannot be a logic one. Similarly, if any one of the inputs to OR gate 104 is a logic one as will occur if any one of the associated photodetectors 98e, 98h, 98i, 98l or 98m is illuminated, then the output of OR gate 104 via path 150 will be a logic one resulting in a logic zero via path 116 at the output of inverter 108, once again providing a logic zero or disable signal at the output of AND gate 102 via path 154. Similarly, if any one of the inputs to OR gate 106 is a logic one, as will result if any of the associated photodetectors 98f, 98g, 98j or 98k is illuminated, then the output of OR gate 106 via path 152 will be a logic one resulting in a logic zero via path 118 at the output of inverter 110, once again causing a logic zero or disable signal to be present at the output of AND gate 102 via path 154. All of the logic described above with respect to Figure 7 is preferably positive

logic although if desired, negative logic could be utilized with corresponding changes in the logic gating network.

Referring now to Figure 3, an alternative embodiment of the insertion security portion 84 of the preferred playback security system 68 described with reference to Figure 2 is shown, the only difference therein preferably being in the replacement of the plurality of light emitting diodes 94 with a single conventional incandescent light source 160 optically associated with the conventional light pipes 96 in a manner previously described with reference to Figure 2. Of course, if desired, the light pipes 96 could be omitted although the use thereof provides increased accuracy and is preferred. Moreover, it should be noted that if desired, passageways 76, 78, 80 and 82 could contain light pipes 96 therein in addition to the aforementioned light pipes or in place thereof.

Referring now to Figures 4, 5, 6 and 16, an alternative embodiment of the playback security system 68 of the present invention, generally being referred to by the reference numeral 68a, is shown and shall be described. This embodiment 68a may also be connected between points 70 and 72 (Figure 1) in place of the embodiment 68 of Figures 2, 7, 15 and 17. As with respect to the preferred embodiment of the playback security system 68 previously described with reference to Figures 2, 7, 15 and 17, the tape cassette housing 26 includes an upstanding portion 74a similar to previously described upstanding portion 74 having a plurality of passageways therein with four such passageways 76a, 78a, 80a and 82a being provided for providing the same correct predetermined playback authorization code, by way of example, previously described with reference to Figure 15. In addition, the playback security system 68a also includes an insertion security portion 84a and a condition responsive portion 86a (Figure 5) operatively associated therewith for controllably enabling the provision of the playback response from the multitrack tape 24. However, in place of the optically readable code for providing the insertion condition therefrom, a "mechanically readable" code is provided by passageways 76a, 78a, 80a and 82a in conjunction with pin members 180, 182, 184 and 186 comprising the insertion security portion 84a, with one such pin member 180 through 186, inclusive, being provided for each correct position in the correct predetermined authorization code pattern or configuration. As also shown in Figures 5, 6 and 16, the upstanding portion 74a also preferably includes an upstanding protrusion, such as a ball 188 for enabling closure of a spring-biased microswitch 190 contained in the condition responsive portion 86a, when

the cassette housing 26 contains the correct predetermined authorization code, as will be described in greater detail hereinafter. Thus, as previously mentioned, the condition responsive portion 86a includes a spring-biased microswitch 190 connected between points 70 and 72 which switch 190 is normally biased to the disable or open circuit condition providing an open circuit path between points 70 and 72 thus disabling the apparatus 20. When the cassette housing 26 is inserted in keyway 92 (Figure 6), if the correct playback authorization code is defined in upstanding portion 74a, passageways 76a, 78a, 80a, and 82a will be mechanically registrable with corresponding pins 180, 182, 184 and 186 so that these pins 180, 182, 184 and 186 will permit insertion of cassette housing 26 into the playback position by extending through the corresponding passageways 76a, 78a, 80a and 82a in upstanding portion 74a. In addition, when these pins 180 through 186 have extended through the corresponding passageways 76a through 82a, ball 188 will be beneath spring-biased microswitch 190 and, because of the confines of the keyway 92 and the location of the microswitch 190 therein, ball 188 will mechanically force microswitch 190 into the closed position illustrated in Figure 5 by overcoming the normal bias force of the spring-biased microswitch 190 which normally biases microswitch 190 to the open position, thereby placing switch 190 in the enable condition and completing the circuit path between points 70 and 72, thus enabling the verbal interactive toy apparatus 20. If, however, the correct playback authorization code, or pattern of passageways defining said code, is not provided then the pins 180, 182, 184 and 186, will prevent the insertion of the cassette housing 26 and, thus, will prevent engagement of means, such as ball 188, for overcoming the biasing force of microswitch 190 to close microswitch 190. Thus, the switch 190 would remain in an open or disable condition, and the playback security system 68a would disable the verbal interactive toy apparatus 20.

Referring now to Figures 8 and 9, the embodiment of the apparatus 20a, similar to the apparatus 20 previously described with reference to Figure 1, employing the preferred playback security system 68 or 68a of the present invention is shown. This embodiment 20a is preferred for the apparatus due to its simplicity over the apparatus 20 of Figure 1 and is preferably identical with that previously described with reference to Figure 1 with the primary exception being that in place of the multitrack head 34 and corresponding multichannel audio amplifier 36, such as the four track head and four channel audio amplifier in the example of Figure 1, a conventional single track mag-

netic playback head 34a and conventional single channel audio amplifier 36a are utilized with the head 34a being mechanically shiftable from track to track in accordance with a mechanical selection mechanism to be described with reference to Figure 9, as opposed to employing a multitrack head 34 which is electronically shifted from track to track although not physically moving as would occur in the case of the single track head 34a. Referring now to Figure 9, a diagrammatic illustration of the mechanical arrangement of the selection buttons or switches 40 through 56, inclusive, is shown. These switches 40 through 56, inclusive, as previously mentioned, are conventional push-button spring-loaded switches having a mechanical interlock between the switches 40 through 56, with the mechanical interlock, represented by reference numeral 200, operating to allow only one switch or button 40 through 56, inclusive, to be depressed at a time while disengaging the corresponding depressed button as another subsequent button is depressed, such as in the key button system utilized in a key telephone system. In addition, the switches or buttons 40 through 56, inclusive, are mechanically interconnected to tape head 34a through a mechanical connecting bar 202 and fulcrum arrangement 204, 206, 208, 210 and 212 with buttons 42, 44 and 46 being further mechanically interconnected so that only one thereof may remain depressed at a time, with buttons 48, 50 and 52 being similarly mechanically interconnected so that only one of these buttons can remain depressed at a time and with buttons 54 and 56 being similarly mechanically interconnected so that only one thereof can remain depressed at a time. The depression of a given button or switch 40 through 56 inclusive, in connection with the associated fulcrum 206 through 212, inclusive, and fulcrum 204 and connecting bar 202 mechanically moves or pivots head 34a to the appropriate track associated with the button being depressed. Thus, the depression of any one of buttons 42, 44 or 46 moves head 34a to track A, the depression of any of buttons 48, 50 or 52 moves head 34a to track B, the depression of either buttons 54 or 56 moves head 34a to track C and the depression of button 40 moves head 34a to track D, in the example being described herein.

As shown in Figures 13 and 14, the verbal interactive toy apparatus 20 or 20a is housed in a robot-like housing 22a, such as the type of robot-like housing described in United States Patent No. 3,947,972 for enhancing the verbal interactive or conversational response effect of the apparatus. Such a robot-like housing, may include a head portion 220 which is shown, by way of example, as having eyes, a nose and a mouth

arranged in the exemplary correct predetermined playback authorization code with, if desired, a globe 222 at the top thereof which may contain a globe lamp 222 of the type described with reference to United States Patent No. 3,947,972. The housing 22a includes the buttons 40 through 56, inclusive, arrayed on the front thereof. However, as shown, a removable template 224 having corresponding alignable apertures therein, is placeable over the button array 40 through 56, and removably held thereon, such as by means of conventional Velcro R.T.M. strips 226 and 228, for labelling the buttons 40 through 56, inclusive, dependent on the information stored on the multitrack tape 24 to be used at a given time in the housing 22a. As previously described, the front of the housing 22a also includes keyway 92 for enabling insertion of the cassette housing 26 therein. Thus, for example, the template 224 may comprise the label arrangement for buttons or switches 40 through 56, illustrated in Figures 1, 8, 9 and 10 for one type of information storage or, by way of another example, may comprise the label configuration illustrated in Figure 13 if the information stored on the multitrack tape 26 is to be a mathematical information format where it may be desired to have button 40 correspond to the "question", button 42 correspond to "choice A", button 44 correspond to "greater than", button 46 correspond to "true", button 48 correspond to "choice B", button 50 correspond to "false", button 52 correspond to "less than", button 54 correspond to "choice C" and button 56 correspond to "equal to". Any other desired "label configuration" could also be provided dependent on the information stored on the tape 24 with the correct template 224, if desired, being provided along with the corresponding tape 24, thus increasing the play value of the toy by significantly increasing its flexibility. If desired, the aforementioned robot-like housing 22a may also include mechanically movable arms 230 and 232 and legs 234 and 236 whose mechanical movement may be conventionally accomplished for further increased play value.

Referring now to Figure 10, another embodiment of a robot-like housing 22 for the apparatus 20 or 20a of the present invention is shown. Preferably, robot-like housing 22 is identical with previously described robot-like housing 22a (Figure 14) with the exception of the provision of a belt pack housing 250 in which a removable belt pack 252 to be described with reference to Figures 11 and 12 is removably insertable, with the belt pack housing 250 and removable belt pack 252 providing a playback security system for the apparatus 20 or 20a housed in the robot-like housing 22 in place of the

previously described playback security system 68 or 68a. Such an arrangement 250—252 is also preferably electrically connected between points 70 and 72 (Figure 1) in place of the previously described embodiments 68 or 68a. As shown in Figure 11, the belt pack housing 250 comprises a unique receptacle configuration in place of keyway 92 with an exemplary configuration being illustrated in Figure 11 having uniquely configured insert portions 254, 256, 258, 260 and 262 providing a predetermined playback authorization code insertion configuration. Portion 258 preferably comprises the location of the conventional spindles 264 and 266 for the storage and take-up reels 27a and 29a for the tape 24 as well as containing the capstan drive mechanism therefor (see 28, 30, 32 of Figs. 1 or 8). In addition, the magnetic playback head 34 or 34a is located therein in playback alignment with the inserted tape 24. As further shown in Figure 12, the removably insertable belt pack 252 comprises a complementary geometric configuration of protrusions 254a, 256a, 258a, 260a and 262a which when belt pack 252 is inserted in belt pack housing 250, fit into the corresponding complementary apertures 254 through 262, as indicated by the dotted lines extending between Figures 11 and 12. In addition, the protrusion 262a on the belt pack 252 is arranged so that when it is inserted into complementary aperture 262, it will close an electrical interlock 190a, such as the spring-biased microswitch 190 previously described with reference to Figures 4 through 6. This electrical interlock 190a is preferably interconnected between points 70 and 72, as was described with reference to the playback security system 68 or 68a for enabling the apparatus 20 and 20a when inserted therein and disabling the apparatus 20 or 20a when such electrical interlock 190a is not closed, the switch 190a normally being biased to the disable or open circuit condition. Thus, belt pack 252 may be utilized in place of the type of tape cassette housing 26 previously described with reference to the playback security system 68 or 68a with the unique pattern of complementary protrusions 254a through 262a providing the playback authorization code. Preferably, the tape 24 is permanently secured to the belt pack 252 so that a different belt pack 252 would normally have to be utilized to provide a different tape 24 for insertion in the robot-like housing 22 to be played back on the playback apparatus 20 or 20a.

If desired, as shown in Figure 18, and in dotted lines in Figure 11, a plurality of identical type electrical interlocks 190a—190d, inclusive, may be utilized in belt pack housing 250 with one such electrical interlock 190b, 190c, 190d and 190a, respectively, being associated with each complementary

aperture or receptacle 254, 256, 258, 260 and 262, respectively, by way of example. In such instance, each of the interlocks 190a—190d, inclusive, comprises a conventional spring-biased microswitch identical to switch 190, normally spring biased to the open circuit or disable condition. As shown and preferred in Figure 18, this plurality of switches 190a—190d, inclusive, are preferably electrically interconnected in series between points 70 and 72 for keeping the apparatus 20 or 20a in a disable condition unless all of the switches 190a, 190b, 190c and 190d are simultaneously closed by insertion of corresponding complementary protrusions 262a, 254a, 256a and 260a in corresponding apertures 262, 254, 256 and 260, respectively, as was previously mentioned with respect to switch 190a, thereby corresponding to provision of the correct predetermined playback authorization code. If all of the required complementary protrusions are not present on a belt pack 252 being inserted in belt pack housing 250, then the series circuit of Figure 18 between points 70 and 72 will not be completed and an open circuit or disable condition for the apparatus 20 or 20a will remain.

Unlike the sophisticated conversational student response teaching apparatus described in United States Patent No. 3,947,972, the apparatus 20 or 20a described herein contains a single primary question or interrogatory message track with the other three remaining tracks in the example given, all simultaneously containing the same question over the same length of tape track and thereafter containing various types of responsive messages with the responsive messages and the interrogatory messages being related in position and content to one another so as to provide an enhanced educational value to the user. While the other three tracks contain responsive messages relevant to the answer given to the question, the primary question track preferably contains additional instructional information. Thus, for a particular interrogatory message contained on the question track, such as track D, the tracks allocated to an incorrect response to the question and therefore containing the incorrect responsive messages for the particular interrogatory message may contain additional instructional messages, or may also contain additional information labelled "more" on a given topic. For example, each of the responsive tracks can initially contain a responsive multiple choice message further indicating that if the user wishes to learn more about the topic of the question asked then he should push the "more" button. In such an instance, the "more" button 56 which is connected in parallel to button 54 associated with track C would be depressed by the user and a

predetermined length segment of additional information relating to the topic would be provided. If the user, however, did not want additional information, then the next interrogatory message on track D would be confined to selection of an answer and therefore a responsive message contained on tracks A and B which on playback would not extend beyond the time required to playback the additional information contained on track C. Thus, as previously mentioned, the various information segments on the tape 24 are set up so as to be time related upon playback. Moreover, this time relationship allows a multiple use of the type previously described herein of each of the tracks. For example, as mentioned above, in the instance where "more" information is to be provided, then the next question on track D could be confined to a "YES/NO" or a "TRUE/FALSE" question if desired. Since the apparatus 20 or 20a is to be employed as a toy, the sophistication of the apparatus described in United States Patent No. 3,947,972 is not desired and the multiple use switches or buttons are readily distinguishable therefrom. In its outward appearance the present apparatus has the operation of the sophisticated system of United States Patent No. 3,947,972 to the user while, in reality, providing a much more simplified configuration for accomplishing the same type of conversational response environment. Depending on the apparatus 20 or 20a being utilized at any instant either a single one of the tracks or all of the tracks A through D are being played back through the playback head. Any one of these tracks is capable of being selected and, as previously mentioned, all of these tracks are related in content. Preferably, as previously mentioned, although track D is essentially the question track, in the preferred apparatus all of the tracks simultaneously contain the basic question. However, when the "more" information condition is present, that track, track C by way of example, does not contain the subsidiary question being asked on the other tracks while the "more" information is provided. This function is different from the system described in United States Patent No. 3,947,972, where one track and one track only was exclusively a question or interrogatory message track.

In order to understand the conversational responsive operation of the apparatus 20 or 20a, a sample programme for storage on magnetic tape 24 is illustrated below, the stored information on the tape and the various tracks being positionally related to each other along the tracks to provide upon playback the conversational responsive environment. In considering this example, it should be noted that, if desired, apparatus 20 or 20a may be placed in a hold mode by

opening switch 66 so that the user may stop the tape 24 from being moved and perform any activity relating to the interrogatory message contained on the tape 24 before selecting an appropriate answer. Moreover, in the example given below, track D, the "question" track is illustratively placed on top of the three other tracks A, B and C.

"SAMPLE PROGRAMME FOR VERBAL INTERACTIVE TOY ROBOTS"

Q Where does the word news come from? I will give you three choices; A the Greek word for nap, snooze; B the points on a compass, or C nobody knows.

Y A Where does the word news come from? I will give you three choices; A the Greek word for nap, snooze; B the points on a compass, or C nobody knows.

N B Where does the word news come from? I will give you three choices; A the Greek word for nap, snooze; B the points on a compass, or C nobody knows.

MORE C Where does the word news come from? I will give you three choices; A the Greek word for nap, snooze; B the points on a compass, or C nobody knows.

Q Choose A, B, or C now . . . you chose no answer. You are a big dummy. Just wait and I will ask you another question . . . I know you are still

Y A Choose A, B, or C now . . . you chose A and you are not correct. The word news comes from the points of a compass N, north; E, east; W, west; and

N B Choose A, B, or C now . . . you chose B and you are correct. N, north; E, east; W, west, and S, south. You are correct and a very smart child.

MORE C Choose A, B, or C now . . . you chose C and you are not correct. The word news comes from the points on a compass N, north; E, east; W, west; and

Q waiting but you should have chosen an answer . . . To learn about a compass, push MORE button . . . I can see you don't like to push buttons

T Y A S, south. If you would like to learn more about the compass push the "MORE" button now . . . Since you have not selected "MORE" I will ask

F N B If you would like to learn more about the compass push the "MORE" button now . . . Since you have not selected "MORE" I will ask

MORE C S, south. If you would like to learn more about the compass push the "MORE" button now . . . Thank you. A compass is a device that

Q much . . . This is a true/false question. Columbus discovered America in 1520. Answer true or false now . . .

- TYA you another question . . . This is a true/false question. Columbus discovered America in 1520. Answer true or false now
- 5 FNB you another question . . . This is a true/false question. Columbus discovered America in 1520. Answer true or false now
- 10 MORE C enables a person to determine direction. Since there are large magnetic deposits at the north pole, a magnetic compass will point to the
- 15 Q You have not chosen. It is too late . . . Keep waiting . . . Here is your next question etc. etc.
- 20 TYA ,Not correct. Columbus discovered America in 1492. You chose the wrong answer . . . Here is your next question etc. etc.
- 25 FNB ,Correct, Correct. Columbus discovered America in 1492 as you probably know. Good work . . . Here is your next question etc. etc.
- 30 MORE C north pole from anywhere on earth. This can help a traveller find his way . . . Here is your next question etc. etc.
- Q=question channel T=true (same as A)
A=answer channel A F=false (same as B)
B=answer channel B Y=yes (same as A)
C=answer channel C N=no (same as B)
- 35 MORE=more information
- 40 In the example given above, it should be noted that the information stored on each of the tracks A through D is continuous on the tape 24 with blank spaces being provided at appropriate intervals on the tape 24 for the appropriate tracks so as to relate the information stored on the various tracks A through D in position and content to provide an appropriate time relationship upon playback, such time relation being illustratively shown in the above example by the illustrative alignment of the information illustrated above.
- 45 Accordingly, with the apparatus of the present invention, a conversational playback response to an answer to an interrogatory message is provided. In the preferred arrangement only properly authorized tapes are playable in the apparatus. This ensures that only tapes having the proper conversational format can be utilized.
- 50 It is to be understood that the above described embodiments of the invention are merely illustrative of the principles thereof and that numerous modifications and embodiments of the invention may be derived within the scope of the claims.
- 60 WHAT I CLAIM IS:—
- 65 1. A recorded information playback device incorporating a removable housing containing a magnetic storage medium on which there is defined a plurality of co-extensive recording tracks, each track storing audio information for playback therefrom in a succession of consecutive discrete information segments, corresponding ssegments in said tracks having coincident starts and finishes, receptacle means for releasably receiving said housing with the storage medium in a playback position in respect thereof, playback means adjacent to the receptacle means and in alignment with the magnetic storage medium for selective playback of the stored audio information from any of said co-extensive tracks, selection means operatively connected to the playback means the operation of which causes the direct selection of one of the tracks and the continuous reproduction of the selected information stored thereon in accordance with programmed variable choices, an audio output means operatively connected to the playback means and the selection means for directly reproducing the information stored on the selected track, and security means associated with the receptacle means and the removable housing which disables the playback means upon insertion of the removable housing into the receptacle means unless an insertion condition required by the receptacle means is satisfied by the said removable housing, wherein at least one of said tracks stores information which when reproduced has in real time a conversational form which spans a plurality of consecutive segments some of which comprise discrete interrogatory messages while at least some of the other tracks store information in respective segments thereof comprising selectable complete messages responsive to choices made by the operator in respect of said interrogatory messages, which responsive messages are sequentially related in real time to respective interrogatory messages, said selection means comprising means for designating only one of said tracks as an interrogatory message track and for designating said other of said tracks as responsive message tracks, there being a real time relationship between adjacent successive interrogatory messages solely dependent upon the relationship between said interrogatory messages on said one designated interrogatory message track and said respective responsive messages on said other tracks, said selection means thereby varying said responsive message in accordance with the selection made by the operator in his choice of response to the respective interrogatory message, whereby said device is capable of controlling in an apparent verbal interaction a response in real time by an operator to

an interrogatory message, which response is contained by a predetermined category of responses, each said choice corresponding to a different response in said category of responses and wherein said security means comprises a playback authorisation code in the form of predetermined physical characteristics provided on said removable housing and detection means associated with said receptacle means for detecting the presence in said housing of the said predetermined physical characteristics.

2. A device according to Claim 1 wherein the selection means comprises a plurality of switch means, one of the switch means being associated with each of the plurality of audio tracks, at least one of the switch means associated with one of the selectable tracks comprising a multiple purpose parallel connected switch bank having a separately operable switch member for each of the multiple purposes, only one of the switch members being operable at a time for the direct selection of the one associated track dependent on the predetermined choice, the predetermined choice being defined in the real time related interrogatory message on the interrogatory message track.

3. A device according to Claim 2 wherein the one interrogatory message containing track further comprises associated multiple choice selectable responses to a particular interrogatory message, the other tracks comprising responsive messages related in real time and content to the interrogatory messages and corresponding to the selected responses, only one of the plurality of other tracks comprising the correct selectable responsive message to a particular real time related interrogatory message.

4. A device according to Claim 3 wherein one of the plurality of other tracks further comprises additional descriptive information relating to the content of the correct selectable responsive message, the interrogatory message track containing a subsequent different particular interrogatory message related in real time but unrelated in content to the additional information on the one additional information containing track with the other responsive message tracks containing selectable responsive messages related in real time and content to the subsequent different particular interrogatory message and related in real time but unrelated in content to the additional information, the switch means associated with the other responsive message tracks having a different selectable purpose for the subsequent different particular interrogatory message than for the particular interrogatory message related to the additional information.

5. A device according to Claim 4 wherein each of the switch means associated with

the responsive message containing tracks comprises a multiple purpose parallel connected switch bank having a separately operable switch member for each of the multiple choices, only one of the switch members being operable at a time for the direct selection of the associated track dependent on the predetermined choice, the predetermined choice being defined in the real time related interrogatory message.

6. A device according to any preceding Claim wherein the responsive message tracks further comprise the particular interrogatory message identical in content and spatially related in real time along the tracks to the particular interrogatory message on the one interrogatory message track, with the selectable responsive messages to the particular interrogatory message being adjacent thereto and spatially related in real time along said tracks to said particular interrogatory message.

7. A device according to any preceding Claim wherein the audio playback means comprises a movable single track audio playback head selectively movable from track to track of the storage medium dependent on the track selected, the multiple choice multipurpose selection means comprising means for moving the single track audio playback head into alignment with the selected track for the reproducing of the selected information stored thereon.

8. A device according to Claim 1 wherein the multiple choice multipurpose selection means comprises a removable template having a plurality of indicia thereon associated with the possible predetermined purposes for the selectable tracks on a particular inserted multitrack storage medium, the template being changeable dependent on the possible predetermined purposes.

9. A device according to any preceding Claim wherein the playback authorisation code comprises a unique configuration of a plurality of protrusions defining at least a portion of the removable housing and the security means further comprises an equal plurality of complementary receptacles for the plurality of protrusions in said receptacle means, the plurality of protrusions being complementarily registrable in the complementary receptacles for enabling complete insertion of the removable housing into the playback position, at least one of the protrusions comprising activation means for providing the insertion condition solely when the plurality of protrusions are in the complementary registration, and the condition responsive means comprises means responsive to the activation means for providing an enable condition of the playback means.

10. A device according to Claim 9 wherein the condition responsive means comprises a spring-biased microswitch normally

biased to the disable condition, and the activation means comprises means for activating the microswitch upon insertion of the removable housing in the receptacle means.

5 11. A device according to Claim 10 further comprising power source means for providing power to enable operation of the audio playback means, the said microswitch being operatively connected between the power source means and the audio playback means for enabling provision of the power to the audio playback means solely in the enable condition thereof.

10 12. A device according to Claim 10 wherein a plurality of the protrusions comprises the switch activation means, and there is a corresponding plurality of microswitches connected in series with each one of the microswitches being responsive to a respective one of the switch activation means, the plurality of microswitches completing the series connection for providing the enable condition in response to completion of the complementary registration of the protrusions with said receptacles.

15 13. A device according to Claim 1 wherein the detection means comprises logic gating means responsive to the insertion condition for providing the enable condition when the insertion condition is satisfied.

20 14. A device according to Claim 13 wherein the authorisation code comprises an optically readable code, the detection means comprising means responsive to the optically readable code for providing a digital signal therefrom to the logic gating means, the logic gating means being responsive to the provided digital signal for providing the enable condition only when the provided digital signal corresponds to the predetermined authorisation code, thereby satisfying the insertion condition.

25 15. A device according to Claim 14 wherein the digital signal providing means comprises means for providing digital signal information corresponding to an unauthorised playback code and digital signal information corresponding to the predetermined playback authorisation code, the logic gating means comprising first AND gate means operatively connected to the digital signal providing means for solely receiving the digital signal information corresponding to the predetermined authorisation code for providing a first authorisation logic output condition when the digital signal information corresponding to the predetermined authorisation code is received thereby, OR gate means operatively connected to the digital signal providing means for solely receiving the digital signal information corresponding to an

unauthorised playback code for providing a first state output condition when the digital signal information corresponding to the unauthorised playback code is received thereby and a second state output condition when the digital signal information corresponding to the unauthorised playback code is not received thereby, logic inverter means operatively connected to the output of the OR gate means for inverting the state output condition thereof for providing a second authorisation logic output condition from the first logic inverter means only when the second state output condition is provided thereto from the OR gate means, and second AND gate means operatively connected to the first AND gate means and the OR gate means outputs for providing the enable condition solely when the first and second authorisation logic output conditions are present.

70 16. A device according to Claim 15 wherein the enable condition providing means further comprises transistor switch means operatively connected to the second AND gate means output for providing the enable condition solely when the first and second authorisation logic output conditions are present.

75 17. A device according to Claim 16, further comprising power source means for providing power to enable operation of the audio playback means, the transistor switch means being operatively connected between the power source means and the audio playback means for enabling provision of the power to the audio playback means solely in the enable condition thereof.

80 18. A device according to Claim 17 wherein the digital signal providing means comprising a photodetector matrix array and an illumination source optically registrable therewith, the optically readable authorisation code comprising a plurality of light transmitting passageways in the housing between the illumination source and the photodetector matrix array in optical registration therewith for enabling selective illumination of the photodetector matrix array for providing the digital signal information dependent on the selectively illuminated photodetector matrix array, the photodetector matrix array being operatively connected to the first AND gate means and the OR gate means for providing the digital signal information thereto.

85 19. A device according to Claim 18 wherein the photodetector matrix array comprises a plurality of photodetectors and the illumination source comprises an equal plurality of light emitting diodes with each one of the diodes being optically registrable with a given one of the photodetectors in the matrix array.

20. A device according to Claim 18 wherein the photodetector matrix array comprises a plurality of phototransistors.

21. A device according to Claim 15 wherein the digital signal providing means comprises a photodetector matrix array and an illumination source optically registrable therewith, the optically readable authorisation code comprising a plurality of light transmitting passageways in the housing between the illumination source and the photodetector matrix array in optical registration therewith for enabling selective illumination of the photodetector matrix array through the housing light transmitting passageways for providing the digital signal information dependent on the selectively illuminated photodetector matrix array, the photodetector matrix array being operatively connected to the first AND gate means and an OR gate means for providing the digital signal information thereto.

22. A device according to Claim 21 wherein the photodetector matrix array comprises a plurality of photodetectors and the illumination source comprises an equal plurality of light emitting diodes with each of the diodes being optically registrable with a given one of the photodetectors in the matrix array.

23. A device according to Claim 18 or 21 wherein the illumination source comprises a plurality of light transmitting optical fibres with each one of the fibres being optically registrable with a given one of the passageways for illuminating a given one of the photodetectors in the array.

24. A device according to Claims 21 to 23 wherein the photodetector matrix array comprises a plurality of phototransistors.

25. A device according to any preceding Claim wherein the receptacle means comprises a unique keyway and the removable housing comprises means co-operable with the keyway.

26. A device according to Claim 1 wherein the playback authorisation code comprises a plurality of passageways in the housing, and an equal plurality of pins selectively registrable in the passageways for enabling complete insertion of the removable housing into the receptacle means to the playback position, switch activation means extending from the housing for satisfying an insertion condition when the pin registration in the passageways corresponds to the predetermined authorisation code, and switch means responsive to the switch activation means for providing the enable condition.

27. A device according to Claim 26 wherein the switch means comprises a plurality of spring-biased microswitches normally biased to the disable condition.

28. A device according to Claim 27 further comprising power source means for providing power to enable operation of the audio playback means, the microswitches being operatively connected between the power source means and the audio playback means for enabling provision of the power to the audio playback means solely in the enable condition thereof.

For the Applicant,
LLOYD WISE, BOULY & HAIG,
Chartered Patent Agents,
Norman House,
105—109 Strand,
London WC2R 0AE.

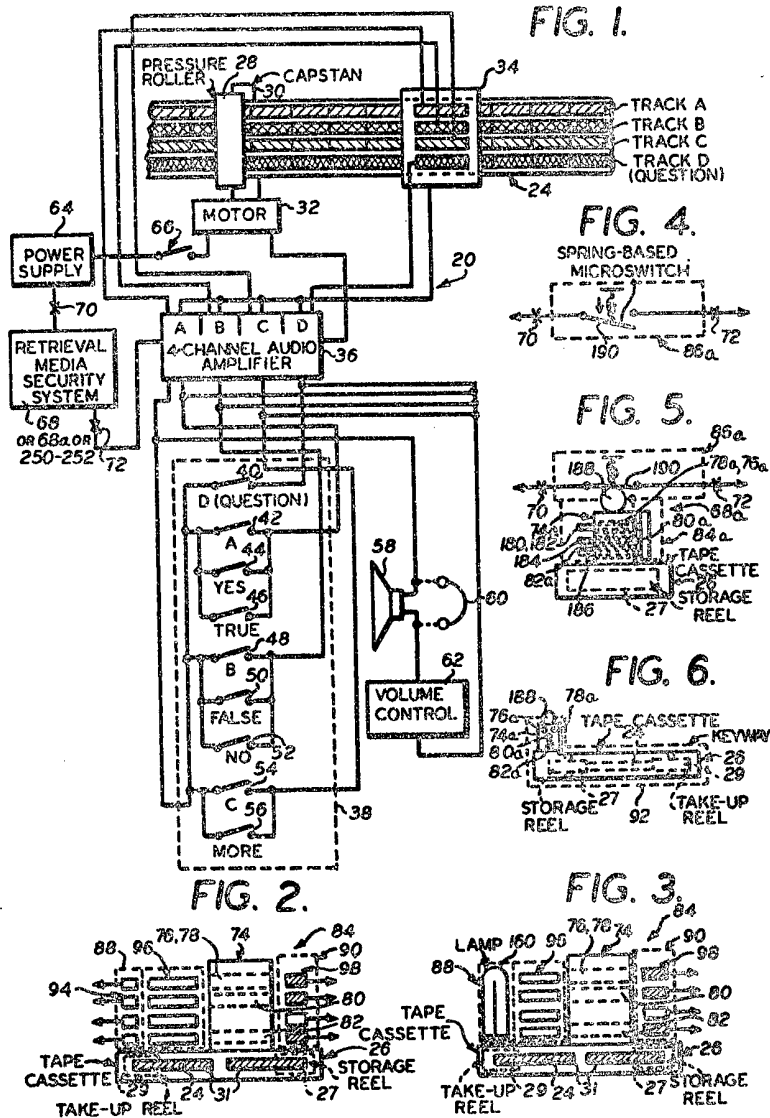


FIG. 7.

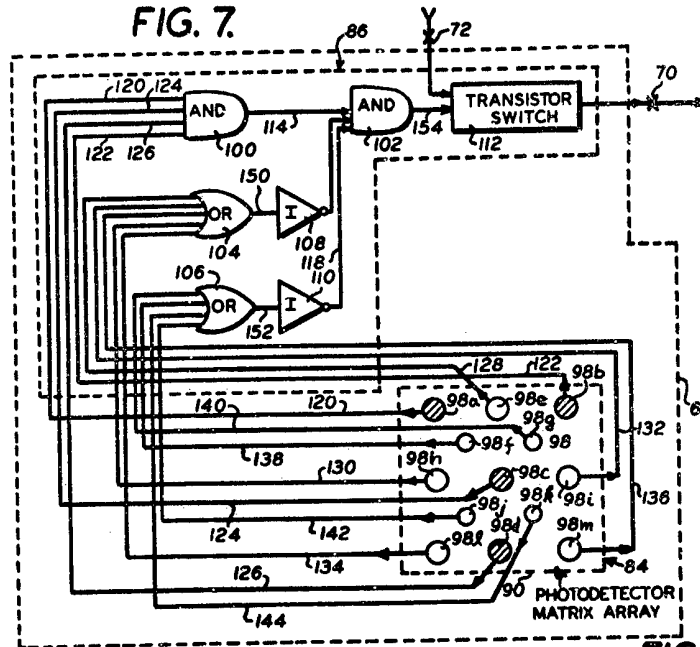


FIG. 9.

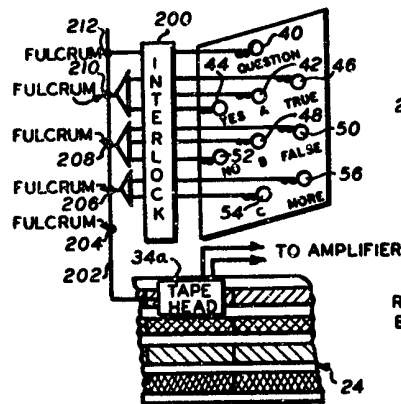


FIG. 10.

