

[54] **PLAYER PIANO WITH
RADIO-CONTROLLED PROJECTION OF
LYRICS**

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[63] Continuation-in-part of Ser. No. 884,597, Dec. 12,
1969, abandoned.

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[51] **Int. Cl.**..... G03b 31/00

[58] **Field of Search**..... 353/15, 18, 122,
353/103, 25, 27; 274/10 D; 84/464

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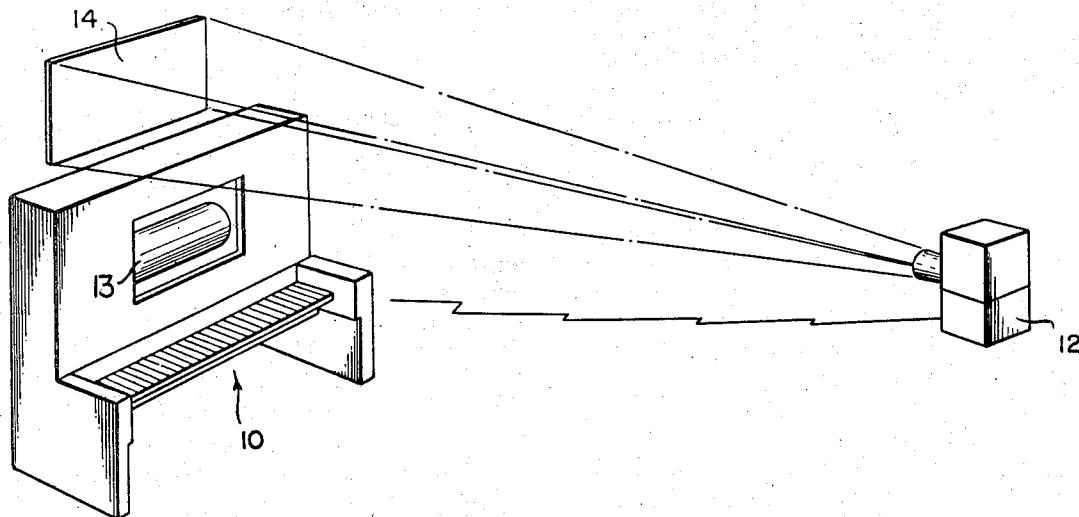
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[57]

ABSTRACT

A coin-controlled player piano is provided with a radio-controlled projection of lyrics therefor. Control circuit means are provided which operate completely independently from the piano roll of the player piano for actuating a slide projector in synchronism with the musical composition being played by the player piano.

6 Claims, 3 Drawing Figures



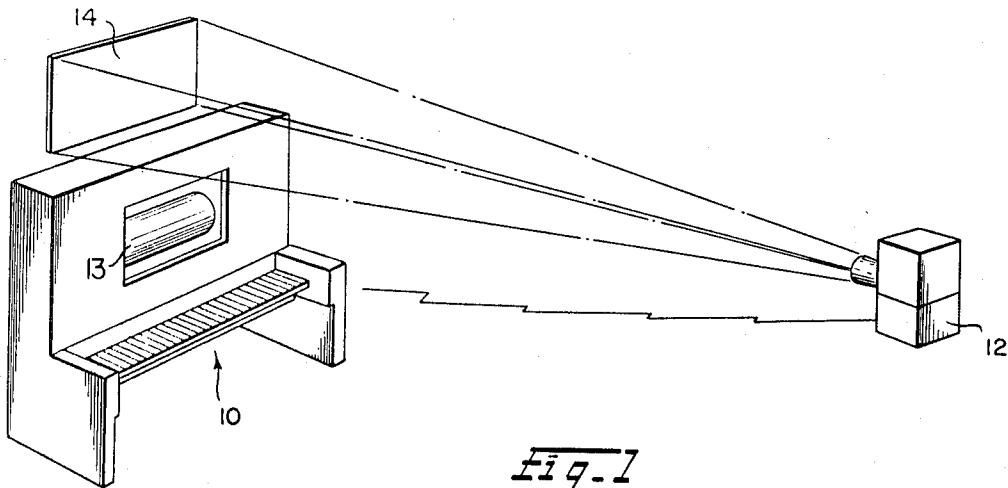
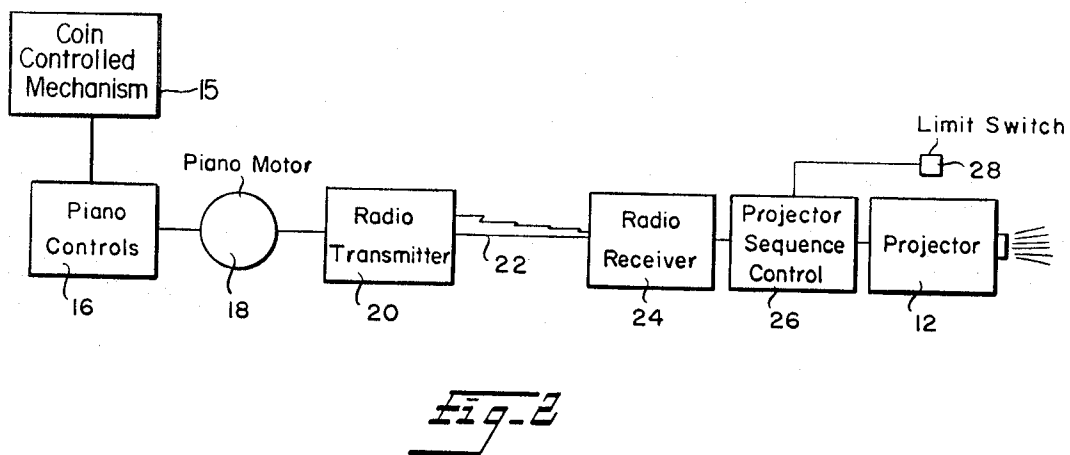
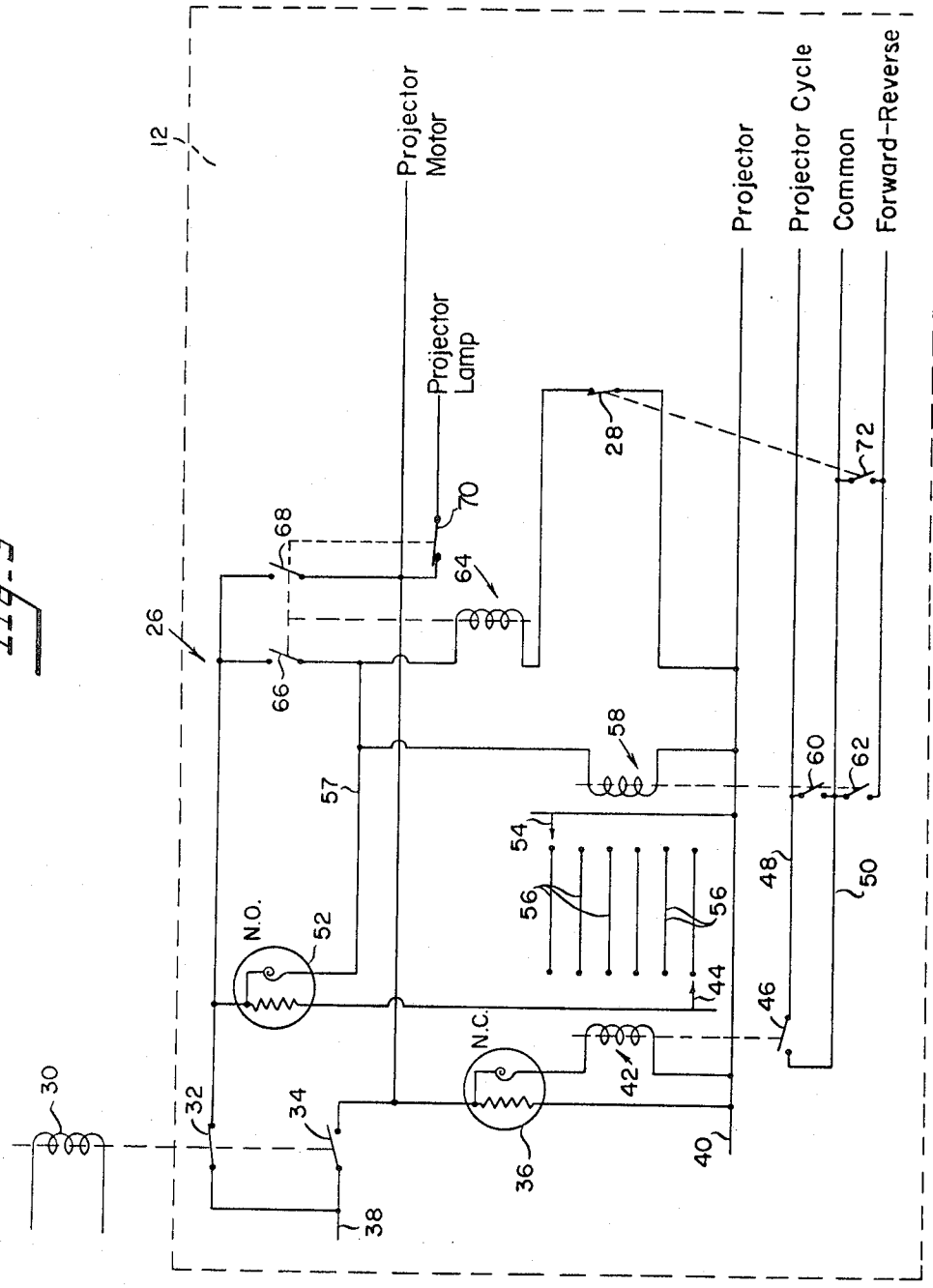


Fig. 3



PLAYER PIANO WITH RADIO-CONTROLLED PROJECTION OF LYRICS

This application is a continuation-in-part of Ser. No. 884,597, filed Dec. 12, 1969, now abandoned. This invention relates to an apparatus to be used in connection with a player piano and, more particularly, to an apparatus for presenting an image of lyrics to a musical composition in synchronism with the playing of that musical composition by a player piano.

It has become popular in recent times to engage in what is termed a "singalong" wherein groups of people gather together to join in on the singing of musical compositions. Whenever the words to the musical composition are not too well known, it becomes a problem to be sure that each participant is provided with the words to the song by one means or another.

While the musical instrument may vary, the present invention is intended for use with a player piano wherein a preset order of songs is arranged and wherein the playing thereof is consecutive on demand. The invention is especially useful in connection with the coin-operated player piano which may be used in public or commercial establishments.

The player piano itself, for purposes of the invention, may be deemed to be standard and be provided with piano controls and a player piano motor. Such a player piano is further provided with a radio transmitter which is activated concurrently with the player piano motor. The radio transmitter sends a signal to a radio receiver which is connected to a control circuit means which in turn controls a projector by means of which an image of at least a portion of the lyrics of a song being played on the player piano is projected onto a screen.

The control circuit means includes switch means carried by the projector for deenergizing the projector, means for determining the number of musical compositions to be played, means to change the direction of rotation of the projector means, and suitable time delay means to ensure that an adequate amount of time is available for projection of the images onto the screen and to effect a resetting of the projector means. While it is presently preferred to display an image of lyrics for an entire musical composition for each such composition being played, it is within the contemplation of this invention that an image of only a portion of a musical composition may be presented on the screen at a given time.

The inherent advantages and improvements of the present invention will become more readily apparent upon considering the following detailed description of the invention and by reference to the drawings in which: FIG. 1 is a perspective view showing the player piano, the projector and the screen;

FIG. 2 is a one line diagram of the controls for the player piano and for the projector; and,

FIG. 3 is a schematic diagram of the projector sequence control illustrated in FIG. 2.

Referring now to FIG. 1 of the drawings, a player piano is indicated generally at 10. The player piano 10 is coin-operated which facilitates its use in public or commercial establishments. The player piano 10 has a music roll 13 mounted thereon which, for purposes of this invention, has two or more songs or musical compositions contained thereon. A projector means is indicated at 12 which is suitably mounted for illuminating

a screen 14 with an image of the lyrics to the particular musical composition being played by player piano 10.

Referring now to FIG. 2, there is illustrated a coin controlled mechanism 15 which is used to actuate the piano controls 16 and thereby start and stop piano motor 18. The coin controlled mechanism 15 is of the type wherein the presence of a coin of proper denomination in a slot completes an electrical circuit and thereby actuates piano controls 16. After imparting this start signal, the coin in the coin controlled mechanism 15 is released from its slot and is received in a coin box. If another coin of proper denomination has been deposited in the coin slot prior to the completion of the musical composition being played it then falls by gravity into position for completing the electrical circuit and thereby re-actuates the piano controls 16 which, in turn, re-starts piano motor 18.

Each time piano motor 18 is started, a radio transmitter 20 transmits a pulse by suitable means such as by power line 22 to a radio receiver 24. The pulse is confined to the power line 22 and travels within the building within which the player piano 10 is placed. Radio transmitter 20 is preferably mounted within the player piano 10 and radio receiver 24 is preferably positioned in the vicinity of projector 12. The radio receiver 24 is provided with means for controlling a projector sequence control 26 constituting control circuit means which serves to start and stop the projector 12 in synchronism with the musical composition being played by piano 10. The assembly carries a limit switch 28 which, if desired, may be mounted on the projector itself so as to deactivate the projector 12.

Referring now to FIG. 3, there is shown the schematic diagram by means of which the projector sequence control 26 which is preferably mounted within the projector 12 as is indicated by the dash lines in FIG. 3. An R.F. relay 30 which is part of the radio receiver 24 controls the position of a normally closed switch 32 and a normally open switch 34. One side of normally open switch 34 is connected to a time delay means 36 having an internal heater filament and a normally closed contact. A suitable voltage, such as 110 volts at 60 cycles per second, is impressed between leads 38 and 40.

Numeral 42 designates a step relay means which is provided with a stepping contact 44. Step relay means 42 controls switch 46 which is connected between lines 48 and 50 which are respectively the common and the forward-reverse lines for the projector 12. Interposed between the stepping contact 44 and one side of normally closed switch 32 is a time delay means 52 which contains a heater filament and a normally open contact.

A selector switch 54 is manually positionable in engagement with one of a series of positions 56 each of which represents a step for the step relay means 42. The setting of selector switch 54 determines the maximum number of selections which are played consecutively by the player piano 10 before the projector 12 is reset and deenergized. Thus, if the music roll 13 contains four musical compositions and if the lyrics for an entire musical composition is contained on each slide, selector switch 54 is set to achieve coincidence of stepping contact 44 with the selector switch 54 after four musical compositions have been played. On the other hand, if music roll 13 contains six musical compositions and again assuming that the lyrics for an entire musical

composition are contained on each slide, selector switch 54 is manually set two additional steps beyond the previous setting whereby coincidence of stepping contact 44 with the selector switch 54 is made after six musical compositions have been played. From the foregoing, it will be apparent that the selector switch 54 and step relay means 42 constitute a counting means in the control circuit for counting the maximum number of musical compositions that have been played. It is impractical to devise a means for playing musical compositions out of order, so that the musical compositions are played consecutively in the order in which they appear on music roll 13. After all the musical compositions on a given music roll 13 have been played, the music roll 13 is rewound automatically by conventional means therefor separate from the projector means.

A conductor lead 57 interconnects the normally open contact of the time delay means 52 with a relay 58 which functions to cancel the step relay 42 whenever the stepping contact 44 reaches the position 56 at which the selector switch 54 is manually positioned. Relay 58 controls switch contacts 60 and 62 which are across the common and projector cycle and across the common and forward-reverse lines respectively for projector 12.

Numerical 64 generally designates a holding relay which controls the position of holding contact 66, a bypass to the projector contact 68, and a normally closed contact to which leads to the projector lamp of projector 12. Contact 70 opens to prevent illumination of screen 14 when the projector is run in a reverse direction. In series with the holding relay 64 is a normally open limit switch 28 carried by projector 12. Limit switch 28 is ganged to normally open switch 72 between the common and forward-reverse lines for projector 12.

In operation, selector switch 54 is manually positioned in contact with a selected position 56 of the step relay means 42 so as to permit the display of the associated slides for a particular music roll 13 on player piano 10. The position in FIG. 3 illustrates the position of the projector sequence control means 26 in the "off" position. When a coin is received in the slot of the coin controlled mechanism 15 an electrical circuit is completed to actuate piano controls 16 and thereby start piano motor 18. This start function causes radio transmitter 20 to produce a pulse which is received by radio receiver 24 to activate the R.F. relay 30 therein. This effects an opening of the normally closed switch 32 and the closing of the normally open switch 34. The time delay means 36, which is preferably a thermal time delay means, permits current to flow through its normally closed contact and through step relay means 42 whereby the stepping contact 44 advances one position. Actuation of step relay 42 also closes the normally open contact 46 completing the circuit between the common and the projector cycle whereby the projector runs for one cycle withdrawing a previous slide and inserting a new slide in the projector means and displaying an image of at least a portion of the lyrics of a musical composition being played by the player piano 10. It is preferred that the lyrics for an entire musical composition be displayed at one time on screen 14 although it is possible to effect this projection of an image of the lyrics sequentially and fragmentarily. An advance of one step in the stepping contact 44 of the step relay means 42 will not establish contact with the selector

switch 54 for the position shown in FIG. 3 wherein time delay means 52, which also is preferably a thermal time delay means, will not be actuated.

The time delay means 36 is used to ensure that step relay means 42 is energized and switch 46 is closed thereby starting the projector cycle. Thereafter, the time delay means 36 is effective to open the normally closed contact therein interrupting the flow through coil 42. Also switch 46 opens whereby only a single slide is fed into the projector means.

Each time another coin is received in the slot of the coin controlled mechanism 15 so as to complete an electrical circuit therein a start signal is received by the piano controls 16 which effectively counts the number of musical compositions which have been played and ultimately results in the stepping contact 44 of the step relay means 42 advancing toward the manually preset position of the selector switch 54. When the stepping contact 44 reaches the preset position of the selector switch 54, the time delay 52 with its normally open contact is activated during the next piano off cycle and with the closing of the contact current flows through reset relay 58 which resets step relay 42 and closes switch contacts 60 and 62 and results in a running of the projector in the reverse direction, namely, toward its start position.

Simultaneously with the actuation of reset relay 58, holding relay 64 is actuated through the normally closed limit switch 28 thereby closing normally open contacts 66 and 68 and opening normally closed contact 70. After the built-in time delay for the time delay 52 has expired, its contact resumes its normally open position. However, a holding circuit is established through reset relay 58 and holding contact 66 whereby current continues to flow through relay 58 causing the switch contacts 60 and 62 to remain closed and causing the projector to continue to run toward the start position for the projector even after the contact for time delay 52 opens.

When the projector reaches its start position, the limit switch 28 (FIGS. 2 and 3) carried by the projector is opened stopping the projector and resulting in a closing of normally open switch 72 by means of which the direction of travel for the projector is reversed. Therefore, the projector will once again run in the forward direction upon receiving a signal from the R.F. relay 30 of the radio receiver causing switch 46 to be closed through the intermediary of switching contacts 32 and 34 and time delay means 36.

From the foregoing it will be apparent that the projection means of the present invention are controlled completely independently from any additions or control signals placed upon the piano roll itself. If desired or necessary, a plurality of step relays can be connected in series to increase the number of slides handled by the projector.

It will be apparent that various changes and modifications may be made in the application disclosed herein without departing from the spirit and scope of the claims which follow:

What is claimed is:

1. In combination with a player piano for playing a plurality of musical compositions which are played consecutively, said player piano having piano controls and a piano motor, the apparatus comprising:

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- a. a coin controlled mechanism for actuating the piano controls and the piano motor at the beginning of each musical composition,
- b. a radio transmitter activated concurrently with said piano motor,
- c. radio receiver means for receiving signals from said radio transmitter,
- d. a screen for the reception of an image of at least a portion of the lyrics of a musical composition,
- e. projector means for projecting an image onto said screen of the lyrics of a musical composition being played by said player piano,
- f. control circuit means activated by said radio receiver means for controlling said projector means,
- g. counting means in said control circuit means for counting the number of musical compositions that have been played, said counting means comprising:
 1. selector switch means manually positionable to establish the maximum count of musical compositions to be played before said projector means is reset and deenergized,
 2. and stepping relay means capable of advancing toward the manually set position of said selector switch means each time a coin is accepted by said

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- coin controlled mechanism.
2. The combination as defined in claim 1 wherein said control circuit means includes limit switch means carried by said projector means for deenergizing said projector means.
 3. The combination as defined in claim 1 wherein said control circuit means includes means to change the direction of travel of said projector means.
 4. The combination as defined in claim 1 wherein said control circuit means includes a first time delay means for the initiation of a cycle of said projector means to ensure an adequate amount of time for the projection of the next image onto said screen.
 5. The combination as defined in claim 4 wherein said control circuit means includes a second time delay means and a holding circuit which is energized to permit resetting of said projector means.
 6. The combination as defined in claim 5 wherein said projector means includes a projector lamp which is energized during the actuation of said projector means with electrical power to said lamp being interrupted during the time said holding circuit is energized.

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