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SYSTEM FOR SELECTING RECORDED MESSAGES

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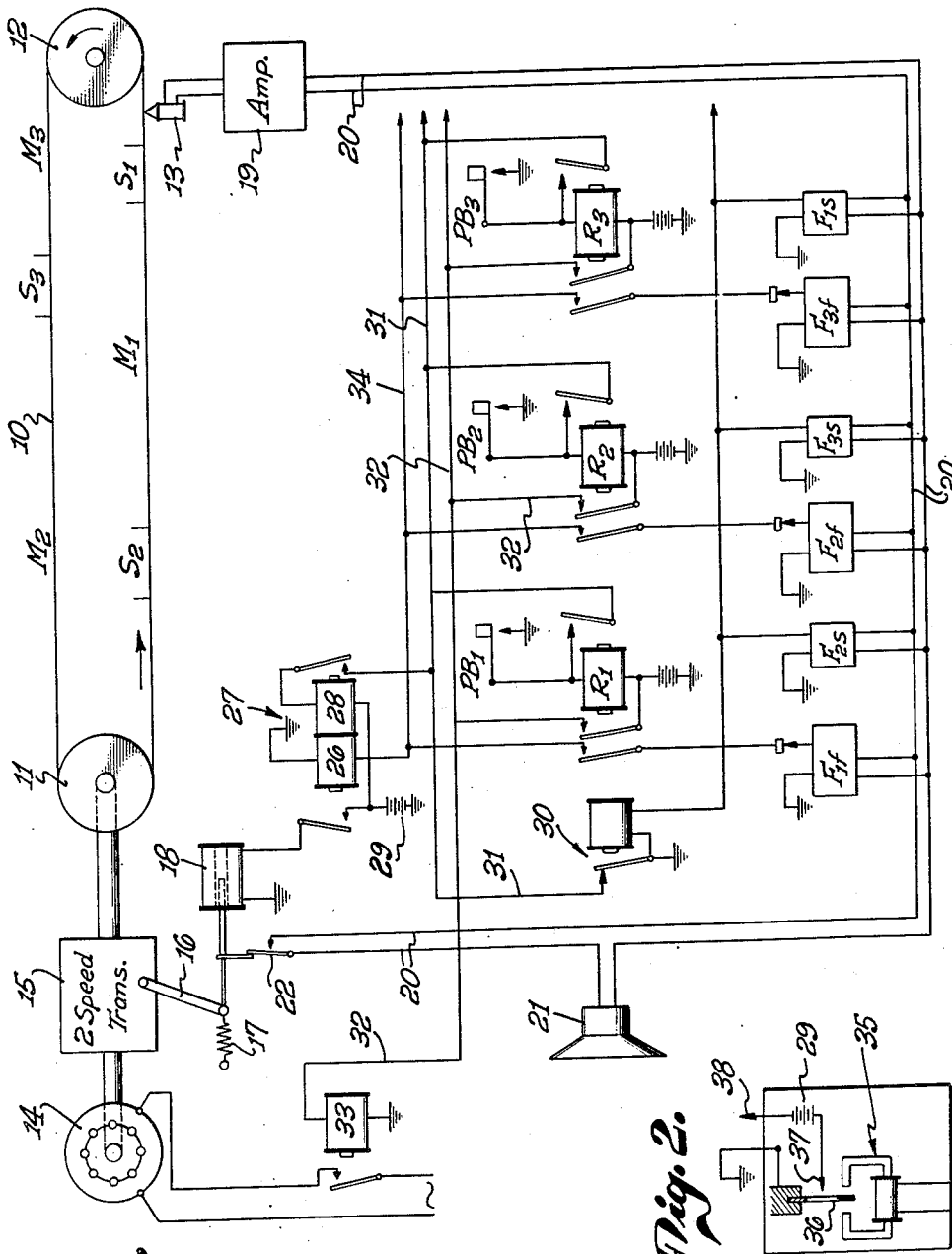
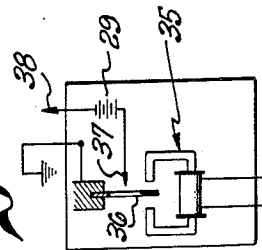


Fig. 1.

Fig. 2.



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SYSTEM FOR SELECTING RECORDED
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5 Claims. (Cl. 179—100.2)

This invention relates to systems for reproducing currents from records and has as a broad object to facilitate the rapid selection and reproduction of any one of a plurality of messages recorded serially on a record.

The system is particularly useful in connection with automatic phonographs employing relatively long sound records bearing a series of different compositions in which it is desired to cause the selection and playing of any desired one of the compositions in response to some simple operation, such as the pressing of one of a plurality of push buttons or the movement of a selection lever, but it is not necessarily limited to sound records.

Briefly, I obtain the desired result in accordance with the present invention by incorporating special single frequency control recordings between the different messages or compositions on the record, each control recording being of different frequency, in combination with selection apparatus incorporated in the reproducing equipment for running the record at high speed until the control recording preceding the desired message is reached, and then reducing the speed of the record to normal and conditioning the reproducing equipment to reproduce the message in response to that control recording.

Various specific objects and features of the invention will become apparent from the detailed description to follow of a particular system illustrated in the drawing, in which:

Fig. 1 is a schematic circuit diagram of the complete system; and

Fig. 2 is a detail schematic diagram illustrating one type of filter that can be employed in the system.

For convenience of explanation, the system is shown applied to a sound reproducing system employing an endless magnetic record of the telegraph type. It is to be understood, however, that other types of records may be employed and may be preferable in some applications of the invention.

Referring to the drawing, an endless magnetic record 10 is shown looped over a driving roller 11 and an idler roller 12 and is moved past a pick-up 13, of any known construction, when the driving roller 11 is rotated by a motor 14 through a two-speed transmission 15. The motor 14 is shown as of the induction type energized from a source of alternating current which, it may be assumed, is of substantially constant frequency. Under such conditions, the motor 14 will operate at a relatively constant speed, which is essential

to the proper reproduction of the frequencies recorded on the record 10.

The two-speed transmission 15 may be of any convenient construction and is for the purpose of driving the record 10 at a low, normal speed during reproduction of a message and at a higher speed to quickly bring a selected message into reproducing relation with the pick-up 13.

The transmission 15 is shown as having a control lever 16 movable to the left by a spring 17 into position to drive the record at high speed, and movable to the right by a solenoid 18 to drive the tape at low speed.

The pick-up 13 feeds into an amplifier 19 which is usually desirable but may not be necessary under all conditions. The amplifier output is connected directly to a line 20 across which the input circuits of various filters F are connected and across which a speaker or reproducer 21 is adapted to be connected by a switch 22 when the solenoid 18 is energized to move the lever 16 into low speed position. Whenever the record is running at high speed, the switch 22 is open to prevent noises in the speaker 21 which would result from movement of the record past the pick-up 13 at the high or selecting speed.

The record 10 has recorded thereon a sequence of message waves interspersed with control or signal waves. In the particular modification shown, it is assumed that there are three different messages identified as M1, M2 and M3, respectively, and interspersed between successive messages there are control waves identified as S1, S2 and S3, respectively. The control wave S1 precedes the message wave M1 and so on. The message waves may be of composite frequency such as sound waves which, when the record is moved past the pick-up 13 at low speed, generate electric waves of frequencies in the audio range. The signal waves S1, S2 and S3, on the other hand, are preferably of single frequency, each different from the others and preferably outside of the audio range so that they can be distinguished from the message waves by suitable filtering devices.

Ordinarily the messages M1, M2 and M3 will be relatively long as compared to the signals S1, S2 and S3 since the latter function merely to change the speed of the record.

To start and stop and controllably vary the speed of the record 10, a plurality of push buttons PB1, PB2 and PB3 are provided, each of which has associated therewith a relay R1, R2 or R3 and a filter F1, F2 or F3, the input ends of which filters are all bridged across the line 20.

The output ends of the filters are adapted to be connected through rectifiers 25 and contacts of the respective relays R1, R2 and R3 to the actuating winding 26 of a relay 27, the latter having a holding winding 28. When actuated, the relay 27 applies current from a source 29 to the solenoid 18 to shift the control lever 16 of the transmission 15 into low speed position.

In addition to the filters F1r, F2r, F3r, there are three filters F1s, F2s, F3s which are used in conjunction with a relay 30 to shut down the system at the end of a message.

Obviously the frequency of the current generated in the pick-up 13 depends not only upon the wavelength of the record wave passing the pick-up, but on the speed at which the record travels. As has been previously indicated, the "slow" speed of the record is such as to faithfully reproduce the message frequencies. The signal waves S1, S2 and S3 produce currents of one frequency when the record is travelling at slow speed and another higher frequency when the record is travelling at high speed. The filters are selectively tuned to the different frequencies generated by the different signal records at the different speeds of the record. Thus filter F1r is tuned to the frequency resulting from movement of the signal record S1 past the pick-up at "fast" speed, whereas the filter F1s is tuned to the frequency resulting from movement of the same signal record S1 past the pick-up at "slow" speed.

The filters F2r and F3r are similarly tuned to the frequencies produced by movement of the signal records S2 and S3 past the pick-up at "fast" speed and the filters F2s and F3s are tuned to the frequencies produced by movement of the signal waves S2 and S3 past the pick-up at "slow" speed.

A clear understanding of the functioning of the system can be had from the following description of the operation:

Let it be assumed that the apparatus is at rest in the condition shown in Fig. 1 and that the push button PB2 is actuated to cause the playing of the message M2 on the record 10. This completes a circuit from the current source 29 through the winding of relay R2 to ground at PB2, thereby energizing the relay which locks up over its holding contact, a line 31, and the back contacts of relay 30 to ground.

Relay R2, when energized, also completes a circuit from battery 29 over its inner left contacts and a line 32 to a relay 33, closing the power circuit to the motor 14 and causing the latter to drive the record 10 at high speed, since the control lever 16 is in "fast" position.

As the record 10 is moved at high speed past the pick-up 13, currents of different frequency are generated as the different message and signal waves move therepast. All such waves after being amplified in the amplifier 19 are applied to the line 20 and to the input ends of all the filters. However, they are not applied to the speaker 21 to produce noises therein because the switch 22 is open.

As the successive signal portions S1, S2 and S3 of the record move past the pick-up 13 at high speed, currents are generated corresponding in frequency to the tuning of the filters F1r, F2r and F3r, respectively, and the currents will pass through the filters. However, the output circuits of the filters F1r and F2r are open at the contacts of their associated relays R1 and R3, so that the record continues to run at high speed until the signal S2 reaches the pick-up. This causes the

generation of currents which pass through the filter F2r and are rectified in the associated rectifier 25. The rectified current flows through the contacts of the energized relay R2, through a line 34, and the actuating winding 26 of relay 27 to ground, thereby energizing relay 27.

As has been previously indicated, the signal portions S1, S2 and S3 of the record are relatively short, and particularly when the record is running at high speed, the signal portions move past the pick-up for only a short time. However, the relay 27 locks up with current supplied from battery 29 through its holding winding 28 and through its holding contacts to line 31 which is normally grounded over the back contact of relay 30.

The energization of relay 27 completes the energizing circuit to the solenoid 18 which moves the control lever 16 to "slow" position and at the same time closes the switch 22 so that the speed of the record 10 is reduced for normal reproduction of the message M2 and the speaker 21 is simultaneously connected to the line 20.

The circuit remains in the condition last described until the message M2 has been completely reproduced, whereupon the signal wave S3 is moved past the pick-up 13, generating a current of frequency which passes through the filter F3s and energizes the relay 30, causing the latter to open its back contact which opens the holding circuits of the relays 27 and R2, thereby restoring the whole system to inactive condition, since the release of relay 27 de-energizes the solenoid 18 and the release of relay R2 opens the energizing circuit of the relay 33.

As has been previously indicated, the control waves S1, S2 and S3 are preferably of wavelength beyond the wave band of the messages M1, M2 and M3, but they may lie either above or below the message waveband. It is feasible to so choose the wavelengths of signals S1, S2 and S3 that they produce frequencies in the sub-audio range, say below 100 cycles, when the record is running at slow speed. The high speed may be five times as fast as the slow speed, which would throw the frequencies generated by the signal waves S1, S2 and S3 into the lower audio range when the record is running at high speed. It is assumed that the filters F1r, F2r and F3r may be of the electrical type, employing as their essential elements capacities and inductances, but since the frequencies F1s, F2s and F3s are to pass relatively low frequencies, they may preferably be of the mechanical type, one example of which is illustrated in Fig. 2. Thus the filter shown in Fig. 2 comprises a polar relay 35 having a vibratory armature 36 supported between the pole-pieces of the relay and so proportioned as to have a natural period of vibration corresponding to the frequency it is to respond to. The winding of the polar relay 35 may be connected directly to the line 20, and when current of the proper frequency is applied to the relay, its armature 36 will vibrate with constantly increasing amplitude until it closes on a contact 37 and closes a circuit from the battery 29 to the line 38 leading to the relay 30 (Fig. 1).

If the wavelengths of the signal waves S1, S2 and S3 are chosen above the audio range, it will be more practical to make all of the filters of the electrical type.

Obviously many departures from the exact circuit shown can be made while still utilizing the advantages of my invention, and it is therefore to be limited only to the extent set forth in the appended claims.

As examples of changes that can be made in the particular system disclosed and described in detail, the record 10 might be of other than the magnetic type. Thus, it might be in the form of a film bearing a sound track, in which case the pick-up 13 would be of photo-cell type, or the record might be of the mechanical type, in which case the pick-up might be of conventional type having a stylus or a needle. Furthermore, the message portions of the record need not necessarily be sound records.

As an example of still another variation, each of the signal records S1, S2 and S3 could carry a second signal wave of the same wavelength on all three records S1, S2 and S3, and one filter substituted for the three filters F2s, F3s and F1s, the substituted filter being responsive to the frequency produced by the second signal wave when the record is moving at slow speed. The frequency might be 20 cycles.

Another refinement that might be introduced is to connect the filter described in the preceding paragraph or the three filters F2s, F3s and F1s to the line 20 on the speaker side of the switch 22, so that those filters do not have to discriminate against any of the frequencies produced during fast operation of the record.

I claim:

1. A system as described, comprising: a record bearing a plurality of sequentially spaced message waves alternated with control waves, each control wave having frequency characteristics distinguishable from the other control waves and from the message waves; reproducing means associated with said record; driving means selectively adjustable for driving said record either at a slow speed such as to intelligibly reproduce the message waves thereon or at a fast speed for message selection; means for adjusting said driving means to drive said record at said fast speed; and means conditionable to selectively respond to one of the different reproduced waves of different frequency characteristics generated in said reproducing means by said different control waves of said record when the latter is moving at said fast speed for adjusting said driving means to drive said record at said slow speed, said message waves on said record being composite in nature and occupying a band within the essential portion of the audio spectrum, and said control waves having wavelengths lying beyond the essential portion of the audio spectrum.

2. A system as described, comprising: a record bearing a plurality of sequentially spaced message waves alternated with control waves, each control wave having frequency characteristics distinguishable from the other control waves and from the message waves; reproducing means associated with said record; driving means selectively adjustable for driving said record either at a slow speed such as to intelligibly reproduce the message waves thereon or at a fast speed for message selection; means for adjusting said driving means to drive said record at said fast speed; and means conditionable to selectively respond to one of the different reproduced waves of different frequency characteristics generated in said reproducing means by said different control waves of said record when the latter is moving at said fast speed for adjusting said driving means to drive said record at said slow speed, said message waves

occupying a wave band corresponding to the audio spectrum, and said control waves lying below the audio spectrum.

3. A system as described, comprising: a record bearing a plurality of sequentially spaced message waves alternated with control waves, each control wave having frequency characteristics distinguishable from the other control waves and from the message waves; reproducing means associated with said record; driving means selectively adjustable for driving said record either at a slow speed such as to intelligibly reproduce the message waves thereon or at a fast speed for message selection; means for adjusting said driving means to drive said record at said fast speed; and means conditionable to selectively respond to one of the different reproduced waves of different frequency characteristics generated in said reproducing means by said different control waves of said record when the latter is moving at said fast speed for adjusting said driving means to drive said record at said slow speed, said message waves occupying a wave band corresponding to the audio spectrum, and said control waves lying above the audio spectrum.

4. A system as described, comprising: a record bearing a plurality of sequentially spaced message waves alternated with control waves, each control wave having frequency characteristics distinguishable from the other control waves and from the message waves; reproducing means associated with said record; driving means selectively adjustable for driving said record either at a slow speed such as to intelligibly reproduce the message waves thereon or at a fast speed for message selection; means for adjusting said driving means to drive said record at said fast speed; and means conditionable to selectively respond to one of the different reproduced waves of different frequency characteristics generated in said reproducing means by said different control waves of said record when the latter is moving at said fast speed for adjusting said driving means to drive said record at said slow speed; and means selectively responsive to reproduce waves generated in said reproducing means by the control waves of said record when the record is moving at said slow speed for stopping said driving means.

5. A system as described, comprising: a record bearing a plurality of sequentially spaced message waves alternated with control waves, each control wave having frequency characteristics distinguishable from the other control waves and from the message waves; reproducing means associated with said record; driving means selectively adjustable for driving said record either at a slow speed such as to intelligibly reproduce the message waves thereon or at a fast speed for message selection; means for adjusting said driving means to drive said record at said fast speed; and means conditionable to selectively respond to one of the different reproduced waves of different frequency characteristics generated in said reproducing means by said different control waves of said record when the latter is moving at said fast speed for adjusting said driving means to drive said record at said slow speed, said reproducing means including message repeating means; and means for disabling said repeating means during operation of said record at said fast speed.

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