

B. P. U. HELLSUND

SOUND SYSTEM FOR MODEL RAILROAD

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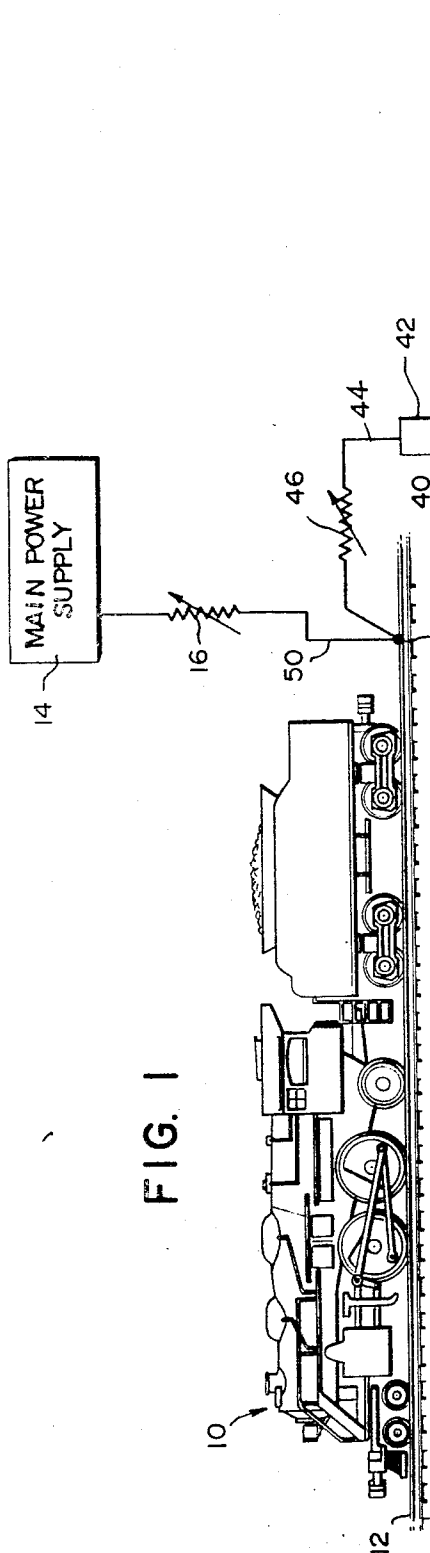
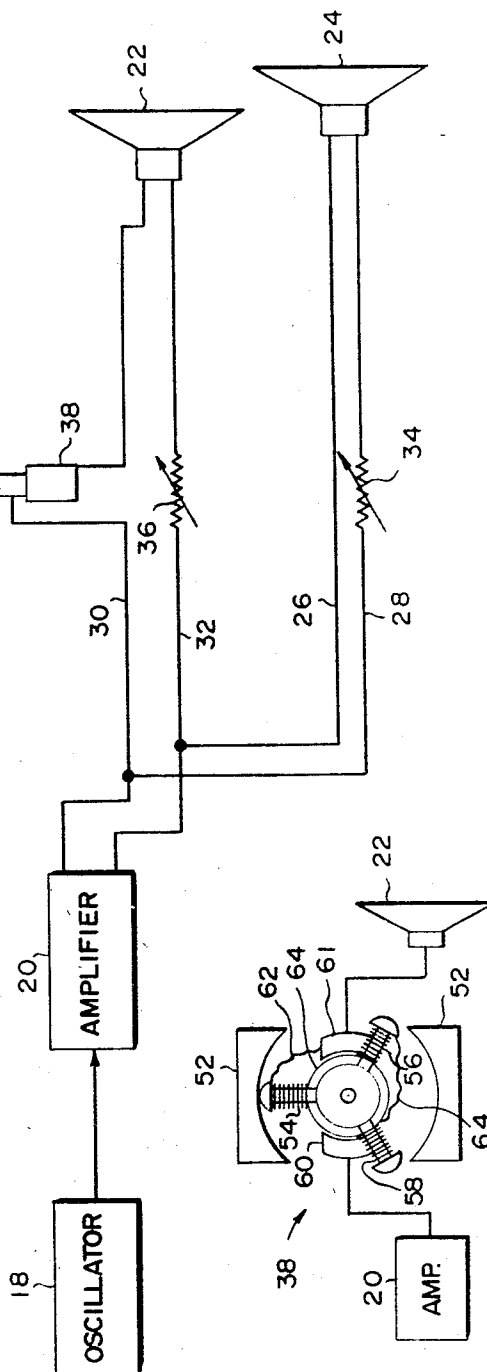


FIG. 2



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SOUND SYSTEM FOR MODEL RAILROAD

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5 Claims

ABSTRACT OF THE DISCLOSURE

The sound of a steam locomotive is produced for a model railroad set by means of an oscillator providing a fixed frequency signal, an amplifier, a rotary switch and a loudspeaker. The rotary switch is driven by a motor connected to the main power supply which operates the model train and upon energization the amplified oscillator signal is interrupted at a rate synchronized with the train speed producing a realistic puffing sound.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates generally to sound systems for model railroads and more particularly is directed towards an electromechanical sound system for model railroads which is synchronized with the movement of the train and faithfully reproduces the characteristic sounds of a steam locomotive.

Prior art

Model railroad enthusiasts are usually very much concerned with obtaining model equipment which is a faithful reproduction on a small scale of original full size equipment. While model train components currently available are generally exact copies of original equipment down to very close detail, there has been no satisfactory audio equipment heretofore available which accurately reproduces the sound of an actual steam locomotive on a synchronized basis. Present systems largely depend upon mechanical means for attempting to duplicate the sound of a steam engine. Such systems are generally unsatisfactory both in the quality of the sound as well as the means for obtaining it. Sound recordings require expensive equipment and are not synchronized with the model train. It is, therefore, an object of the present invention to provide a new and improved system for generating sounds which closely duplicate the sounds of a steam locomotive for use with model trains and the like. It is a further object of the invention to provide a sound system for model trains which is self-synchronizing with the movement of the train, dependable in operation, of simple construction and low in cost.

SUMMARY OF THE INVENTION

This invention features a sound system for hobby trains, comprising an oscillator adapted to generate a steady frequency signal, an amplifier for amplifying the oscillator output, at least one loud speaker connected to the amplifier, and a motor-driven rotary switch for interrupting the amplifier output. The signal is passed through the switch, which, in the preferred embodiment, is in the form of a modified motor and upon rotation serves cyclically to interrupt the signal. A driving motor is connected to the rotary switch and is energized by a main power supply which operates the train. The connection to the driving motor is such that as the speed of the train is increased with an increase in power to the tracks a resulting increase is obtained in the speed of the motor which in turn increases the rate of interruption of the signal. The result is that a puffing sound is produced at the loud speaker which sound is remarkably like that of a conventional

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steam locomotive. The puffing sound is synchronized with the speed of the train, the rate increasing or decreasing with an increase or decrease in the speed of the train. A second speaker may be connected to provide a steady hissing sound such as that given off by a steam locomotive when it is stopped but with steam up.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic diagram of a sound system made according to the invention, and,

FIG. 2 is a sectional elevation, somewhat schematic, of a rotary switch made according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings and to FIG. 1 in particular, reference character 10 generally indicates an electrically operated scale model of a steam locomotive such as used by model railroad enthusiasts and mounted on electrically conductive tracks 12. As is the practice with model railroad trains, the locomotive 10 is provided with a self-contained electric motor which is energized by a DC power supply 14 connected to the track 12 through a variable rheostat 16. The speed of the train is controlled by means of the rheostat which increases or decreases the power to the track and the train.

The sound system which is the subject matter of the present invention includes an oscillator 18 adapted to generate a steady frequency signal which is fed into an amplifier 20. It will be understood that the oscillator and amplifier are connected to a suitable power supply in a conventional manner. The amplifier 20, in the illustrated embodiment, is connected to a pair of loud speakers 22 and 24 through leads 26, 28, 30 and 32. Leads 28 and 32 are provided with variable resistors 34 and 36 to control the audio level of the speakers. It will be understood that the speaker 24, being connected in the manner illustrated, will produce a steady hissing sound when operated insofar as the input to the loud speaker is a fixed frequency signal originating at the oscillator.

In the circuit for the speaker 22, there is connected a rotary switch 38 drivingly connected through reduction gears 40 to a motor 42. The motor 42 in turn is connected by lead 44 through a trimming potentiometer 46 to the track 12 at point 48 where a main power supply lead 50 is also connected. The function of the rotary switch 38 is to interrupt the steady signal output of the oscillator and amplifier before it reaches the loud speaker 22. The driving motor 42, being connected to the main power supply 14 at the track connection 48 will operate in synchronism with the motor in the locomotive 10. The motor 42, which controls the speed of the rotary switch 38, will thus synchronize the rate of interruption of the circuit for the speaker 22 with that of the speed of the locomotive 10. Thus as the locomotive 10 speeds up in response to an increase in power to the tracks, the motor 42 will also speed up as will the rate of interruption of the circuit for the speaker 22. The result will be a puffing sound emitted by the speaker 22 which puffing sound is a faithful reproduction of the puffing sound emitted by a conventional steam locomotive moving along tracks. As the speed of the locomotive 10 is decreased, the speed of the motor 42 is likewise decreased as is the rate of interruption of the signal to the speaker 22 by the rotary switch 38. Thus the frequency of the puffing sound emitted by the speaker 22 will be decreased in synchronism with the decrease in speed of the locomotive 10.

Referring now more particularly to FIG. 2, the rotary switch 38 will now be described in detail. It has been found that a modified electric motor provides the most realistic puffing steam sound for the system. In practice, the modified electric motor switch 38 comprises fixed field

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magnets 52, armature windings 54, 56 and 58, brushes 60 and 62 and a commutator 64. In accordance with the present invention, certain of the windings are disconnected while others are connected and in the switch motor shown windings 54 and 56 are connected by lead 62 and windings 56 and 58 are connected by lead 64, while adjacent windings 54 and 58 are disconnected. Brush 60 is connected to the amplifier 20 while brush 62 is connected to the speaker 22.

In operation, the armature and windings will turn between the brushes, the circuit being interrupted by the break between the adjacent windings. Thus for a portion of each cycle, a steady signal will pass through the device 38 to the speaker 22 while in another portion of the cycle this will be cut off, interrupting the circuit in a rising and falling manner. The interruption of the circuit is relatively gradual by reason of the brushes spanning the commutator sections, this relatively gradual interruption of the circuit serving to prevent a sharp on-off noise at the speaker and being much more characteristic of a reciprocating piston in a steam cylinder such as found in steam locomotives.

It will be understood that while a three pole motor is shown in FIG. 2 this may be varied by using motors with a different number of poles, it being necessary to disconnect selected windings in order to obtain the desired circuit interruption between the amplifier and the speaker.

Having thus described the invention, what I claim and desire to obtain by Letters Patent of the United States is:

1. A sound system in a model electric train system having tracks, a motor-driven model train and a variable power supply comprising:

- (a) an oscillating signal source of fixed frequency.
- (b) a loudspeaker,
- (c) a switch connected between said source and said loudspeaker,
- (d) a variable speed motor drivingly connected to said switch for opening and closing said switch thereby interrupting the signal between said source and said loudspeaker to cause a puffing sound to be emitted by said loud speaker, and,
- (e) circuit means connecting said motor to said power supply whereby the speed of said motor and the frequency of said puffing sound will be synchronized with the speed of said train.

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2. A sound system according to claim 1 wherein said switch is of a rotary type.

3. A sound system according to claim 1 wherein said switch includes a rotatable commutator and fixed brushes in contact therewith.

4. A sound system according to claim 3 wherein said switch includes a plurality of windings certain ones of which are connected to one another and to said commutator, and at least one of said windings is disconnected from the others.

5. A sound system in a model electric train system having tracks, a motor-driven model train and a variable power supply, comprising

- (a) a fixed frequency oscillator,
- (b) an amplifier connected to said oscillator,
- (c) a pair of loudspeakers connected to said amplifier,
- (d) a rotary switch connected to said amplifier and one of said loudspeakers,
- (e) a variable speed motor drivingly connected to said switch for cyclically opening and closing a circuit to said one loudspeaker thereby interrupting the output from said amplifier to said one loudspeaker to cause a puffing sound to be emitted by said one loud speaker, and,
- (f) circuit means connecting said variable speed motor means to said power supply whereby the speed of said train will be synchronized with the speed of said motor and the frequency of said puffing sound.

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