

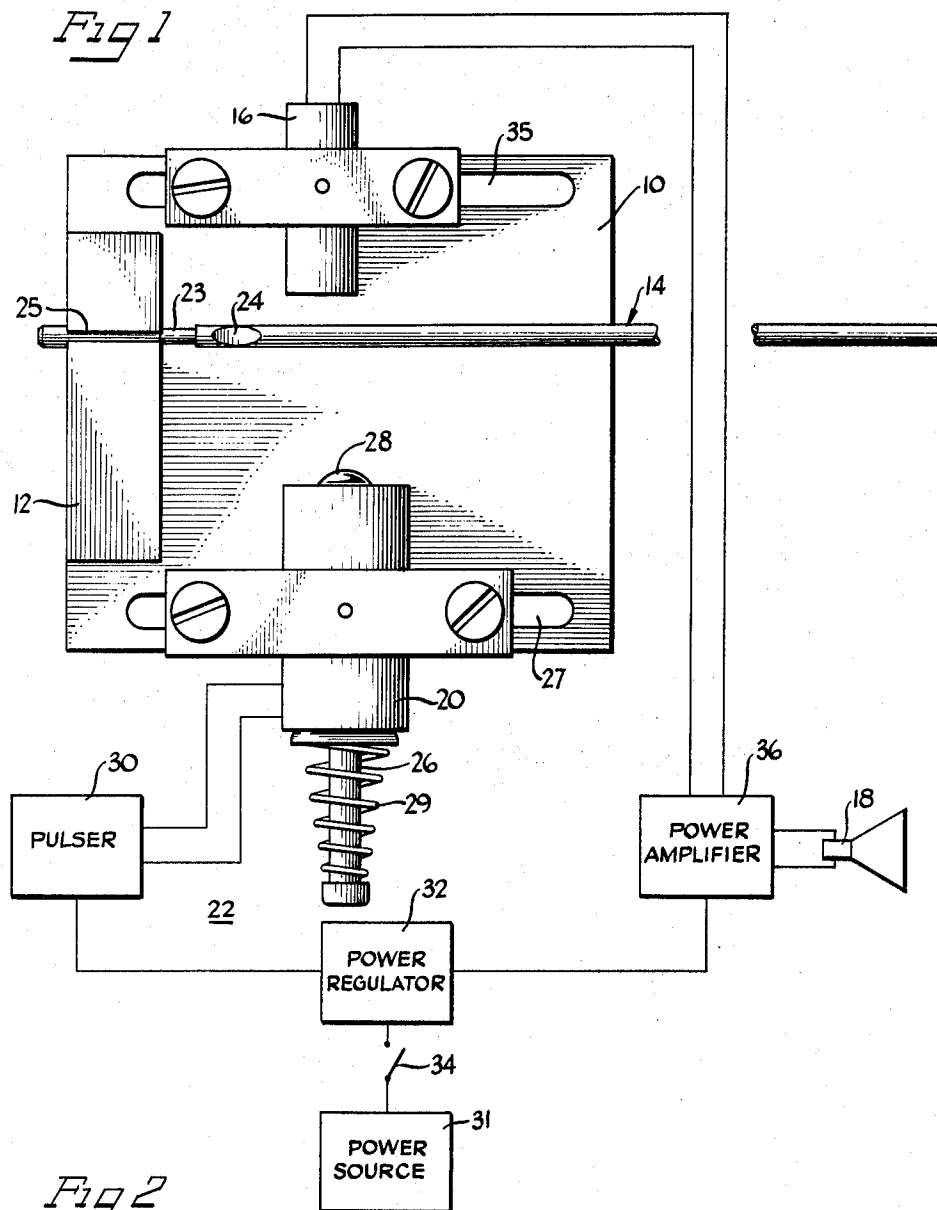
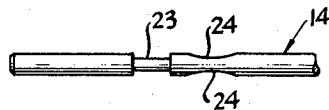
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ELECTRONIC BELL DEVICE FOR RAILROAD LOCOMOTIVE

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3,249,933 ELECTRONIC BELL DEVICE FOR RAILROAD LOCOMOTIVE

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The present invention relates to signalling devices and more particularly to a device for providing an untuned cast bell tone for use on railroad locomotives.

Normally, all locomotives are equipped with an untuned cast bronze bell which is percussively vibrated at a predetermined rate by an electro-pneumatic striker unit. In this connection, a source of air is connected through suitable piping to a pneumatically operated striker disposed adjacent the cast bell. A solenoid operated valve is disposed in the air piping, the solenoid being energized by a direct current power supply selectively connected thereto by a switch. Normally, at least the bell and the striker unit are mounted in an unheated area of the locomotive.

During cold weather, the moisture in air passing through the air piping frequently freezes and causes a stoppage in the flow of air therethrough thereby making the bell inoperative. The freeze-up is caused by the freezing of the moisture in the air as the pressurized air from the warm atmosphere expands in the cold piping adjacent the bell. Since the locomotive cannot be moved unless the bell is operative, such a freeze-up causes costly down time of the locomotive.

It is an object of the present invention to provide an improved signalling device for a railroad locomotive. Another object of the invention is the provision of an electronic bell device for a railroad locomotive. Still another object is the provision of a signalling device for a railroad locomotive which provides a sound similar to that afforded by an untuned cast bell. A further object is the provision of an electronic bell device for a railroad locomotive, which is relatively simple to manufacture and durable in use.

Other objects and advantages of the present invention will become apparent by reference to the following description and accompanying drawings.

In the drawings:

FIGURE 1 is a schematic drawing of an embodiment of an electronic bell device for a railroad locomotive; and

FIGURE 2 is a fragmentary view of the tone generator shown in FIGURE 1, which tone generator is removed from its support means and rotated 90 degrees about its axis.

As shown in the drawing, the electronic bell device for a railroad locomotive generally includes a frame 10 and a support means 12 on the frame for carrying an elongated untuned tone generator 14. A pickup means 16 is mounted on the frame and along the length of the tone generator 14. The pickup means converts vibrations of the tone generator into electrical signals and supplies the same to a loud speaker 18. A striker means 20 is provided along the tone generator 14 which percussively causes the tone generator 14 to vibrate. The striker means 20 is selectively actuated at a predetermined rate by a circuit means 22.

More specifically, the tone generator 14 shown in the drawing is in the form of an elongated cylindrical bar having a reduced neck portion 23 adjacent one end thereof. Two opposed depressions 24 are provided in the bar adjacent the neck portion 23. The bar is made of a material which can withstand the environment of a railroad locomotive. It has been found that a bar 14

made out of steel affords the preferred results. The bar 14 is fixedly supported at the end thereof adjacent the neck portion by the support means 12 which is a block, preferably of relatively heavy mass so that relatively no vibration thereof occurs when the bar 14 is caused to vibrate. In this connection the end of the bar is inserted in an opening or slit 25 in the block and the block is drawn into clamping engagement by a suitable fastening device (not shown). The support means 12, in turn, is mounted to the frame 10 which in the illustrated embodiment, is a flat plate of a suitable material such as steel.

The shape of the bar 14 is so selected that its modes of vibration produce a sound which approximates that of the untuned cast bell which has been employed on railroad locomotives. The standard untuned cast bell of a locomotive has a nominal pitch of approximately F₅* plus 42 cents and tone components of an octave below, a third above, a fifth above, and an octave above. In one embodiment, a heat-treated steel rod 1/8-inch diameter by approximately 11 inches long which has a nominal pitch of F₅* is suitably machined at its neck to provide approximately the sound of the untuned cast bell.

The bar 14 is percussively caused to vibrate by the striker means 20 which, in the illustrated embodiment, is a solenoid mounted on the frame 10 so that an armature 26 thereof reciprocates perpendicularly to the bar 14. A slot 27 is provided in the frame 10 to permit adjustment of the solenoid along the length of the bar 14. The armature 26 strikes the side of the bar 14 when the solenoid 20 is energized. The armature 26 is provided with a head 28 of a hard material which does not damage the bar. It has been found that preferred results are obtained with a head made of metal. The armature 26 is returned to its de-energized position by a spring 29.

In the illustrated embodiment the solenoid 20 is energized by the circuit means 22 which includes a source of pulse or a pulser 30. Preferably, the pulser is in the form of a conventional transistorized regenerative amplifier, since the pulse rate of a regenerative amplifier is readily adjustable. A free-running multivibrator may also be used in certain applications. The pulser 30 provides pulses as long as power is supplied thereto, and is preferably adjusted to energize the solenoid 20 at a rate similar to the striking rate of the cast bell previously provided on railroad locomotives. In this connection, the pulser 30 is adjusted to produce approximately 80 strikes per minute and is preferably adjustable between 50 and 100 strikes per minute.

Power is supplied to the pulser 30 by a source 31 of direct current which is connected to the pulser 30 through a power regulator 32 which may be of the conventional type. A switch 34 is provided between the power source and the power regulator 32 so that the pulser 30 may be selectively turned on and off.

The vibrations of the bar 14 are converted into electrical signals by the pickup means 16 which is suitably mounted to the frame 10 along the length of the bar 14. A slot 35 is provided in the frame 10 to permit the pickup means 16 to be positioned along the length of the bar 14. The pickup means 16, which may be of the conventional magnetic type, is connected through a conventional transistorized power amplifier 36, to the loud speaker 18. Direct current power is provided for the power amplifier 36 by the power regulator 32. Thus, power is only utilized by the signalling device when the same is in operation.

As can be seen from the above, a signalling device is provided in which the only moving part is the armature of the solenoid. Hence, the signalling device is not affected by cold weather. Moreover, the initial installation of the electronic signalling device is considerably

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less than the cast bell signalling device previously employed on railroad locomotives.

Various changes and modifications may be made in the above described electronic signaling device for locomotives without departing from the spirit or scope of the present invention. Various features of the invention are set forth in the accompanying claim.

I claim:

An electronic signaling device for railroad locomotives comprising a frame, an elongated tone bar having a reduced neck portion at one end and a depression adjacent said neck portion, means mounting said bar at said one end on said frame, pickup means for converting vibrations of said tone bar into electrical signals, a loud speaker coupled to said pickup means, means mounting said pickup means on said frame along the length of said tone bar, striker means, means for mounting said striker means on said frame along the length of said

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tone bar, said striker means being effective to strike said tone bar intermediate said depression and the other end of said bar, whereby said bar is vibrated to simulate an untuned cast bell, circuit means coupled to said striker means for actuating the same at a predetermined frequency, and means for selectively energizing said circuit means.

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