Dec. 6, 1932. H. R. HOWSER, JR 1,889,918

SOUND ATTACHMENT FOR TOY LOCOMOTIVES

Filed May 23, 1932

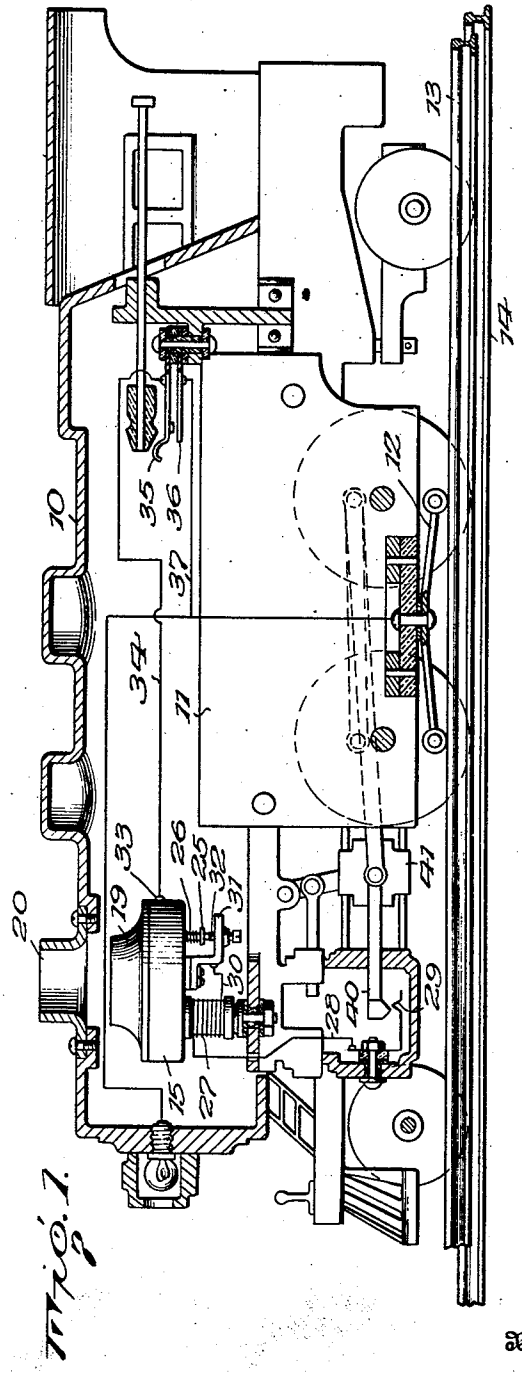


Fig. 1.

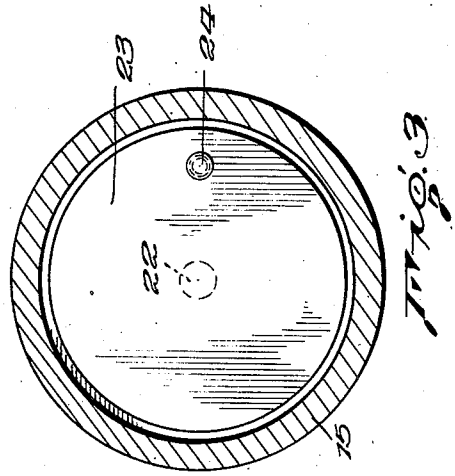


Fig. 3.

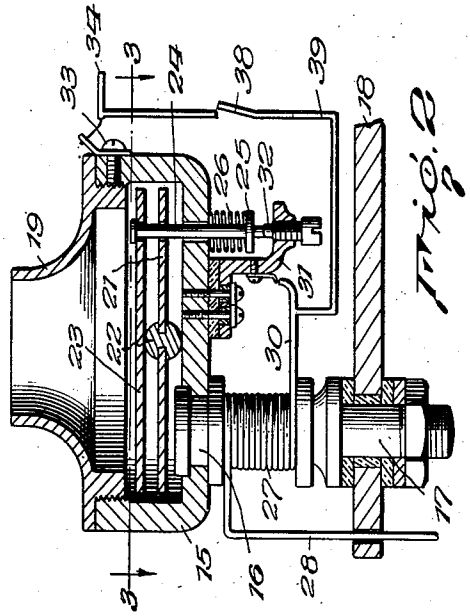


Fig. 2.

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UNITED STATES PATENT OFFICE

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SOUND ATTACHMENT FOR TOY LOCOMOTIVES

Application filed May 23, 1932. Serial No. 613,084.

This invention relates to sounding wheeled toys particularly to toy steam type locomotives.

An object of the invention is the provision in a toy steam type locomotive of electrically operated means for simulating the puffing sound produced by steam exhausting from the cylinders of a steam locomotive while in motion.

Another object of the invention is the provision of electrically operated sound producing means in an electrically driven toy steam type locomotive which derives its operating current from the track supply that drives the toy.

A further object of the invention is to provide means on a toy steam type locomotive for intermittently opening and closing the operating circuit for an electrically operated sound producing means in synchronism with the speed of the locomotive.

A still further object of the invention is to provide electro-magnetic sound producing means in a toy steam type electrically driven locomotive that is operated from the track supply either by alternating or direct current.

Other objects will, from the description, be apparent to those skilled in the art. The present disclosure constitutes an exposition of an embodiment of the invention, and illustrates the best means I have thus far devised for reducing the invention to practice. It is to be understood that the structural details shown and described shall not constitute limitations inconsistent with the scope of the invention as claimed.

Figure 1 of the drawing is a longitudinal section through an electrical toy steam locomotive, with the sounding apparatus shown in elevation.

Figure 2 is substantially a section through the sounding apparatus.

Figure 3 is a section on line 3—3 of Figure 2.

In its broad aspects the invention comprises the combination with a toy steam type locomotive, of electrically operated sound producing means simulating the sound of exhaust steam. The sound producing means is intermittently operable through the momentary closing of its operating circuit by a make and break circuit closer actuated from a member movable in synchronism with the speed of the locomotive. More specifically its use is on an electrically driven toy locomotive wherein the sound producing means derives its operating current from a track source supplying the locomotive motor.

In the embodiment disclosed 10 indicates the metal body of a toy steam locomotive adapted to be propelled along a track by an electric motor, not shown, in the motor housing 11. A contact shoe 12 electrically connected with the motor travels along a third rail 13 to establish one side of the line, the other being completed through the frame, wheels and rails, one of which is shown at 14.

Within the body 10 is mounted the sound producing apparatus which comprises a dished circular metal casing 15 attached to one end of a magnet core 16 secured in an upright position to a supporting spindle 17 insulated with respect to and suitably anchored in a bracket 18 provided on the body. A horn element 19 is attached to the casing in a manner to localize sound through the open smoke-stack member 20 of the locomotive. Within the casing 15 and loosely seated therein is a diaphragm 21 having a balled central member 22 resting on the casing bottom whereby the diaphragm may be rocked under the magnetic attraction of the core 16; the point of attachment of the core and casing being eccentric with respect to the vertical axis of the casing and ball 22. A second diaphragm 23 is loosely seated on the ball 22 above the diaphragm 21 so that it too may be rocked.

The double diaphragm assembly is spring urged away from the head of the magnet core by means of a pin 24 headed above the diaphragm 23 and passed loosely through both diaphragms and the bottom of the casing, through apertures provided therein for the purpose. Pin 24 extends beneath the bottom wall of the casing and carries adjacent its lower end a metal washer 25 fixed to the pin and providing an abutment for one end of an expansion spring 26 surrounding the shank of the pin with its other end bearing against the casing bottom. The pin is so located that

its pull, under action of the spring 26, influences the diaphragm assembly in diametric opposition to the magnetic pull of the core 16 when energized.

The core 16 of the magnet is wound with a coil 27 whereof one lead wire 28 connects with a spring finger contact 29 insulated from and supported by that part of the locomotive body which simulates a steam chest and cylinder. The other lead wire 30 from the magnet coil is connected, where direct current track supply systems are employed, to a metal bracket 31 insulated from and supported by the bottom of casing 15. This bracket carries a screw thread adjustable contact point 32 axially aligned with pin 24 of which the lower end constitutes the other contact point of an interrupter wherein the metal pin and metal spring 26 electrically connect with the casing 15. Casing 15 is provided with a terminal connector 33 whence a wire 34 leads to one terminal 35 of the control switch. The other terminal 36 of the control switch is connected through wire 37 with the contact shoe 12.

Where alternating current is utilized to operate the locomotive, as in the majority of instances it will be, the interrupter is cut out by closing switch 38 in a shunt line 39 connecting magnet lead 30 with wire 34. In case adaptation of the device to direct current is not a requirement, bracket 31 and its contact point 32 may be dispensed with and the lead wire 30 from the magnet placed in permanent connection with wire 34 to the control switch.

The spring contact finger 29 has a portion disposed in the path of travel of a movable metal member 40 which is intermittently wiped across the contact finger through means operated from or by a wheel or axle of the locomotive, member 40 being thus grounded to the rails 14. In the disclosed embodiment this is accomplished through wiping contact of the toy connecting rod 40 which in this type of locomotive reciprocates from the cross-head 41.

In operation on a direct current track supply system the closing of contacts 35 and 36 on closing movement of the control switch establishes a circuit from rail 13 through contact shoe 12, wire 37, contacts 35 and 36, wire 34 and terminal 33 to the metal casing 15 of the sounding apparatus. From casing 15 the circuit is continued through spring 26, metal washer 25 and pin 24, through abutting interrupter contact point 32, bracket 31 and wire 30 through magnet coil 27 and wire 28 to the spring contact finger 29.

As the locomotive moves the connecting rod contact 40 wipes back and forth across finger 29 intermittently completing the circuit through the locomotive body and wheels to rails 14.

Upon complete closing of the circuit the magnet core 16 is energized to attract diaphragms 21 and 23 which rock on ball 22 to pull pin 24 away from its contact with the point 32 thus interrupting the circuit to de-energize core 16 and permit spring 26 to reestablish the circuit by moving pin 24 back into contact with point 32, rocking the diaphragms away from magnet core 16. This action continues as long as the circuit is closed at 29—40, providing an interrupter which causes a rapid actuation of the diaphragms in a manner which produces a sound simulating the exhaust of steam from the cylinder of a locomotive in motion.

In an alternating current track supply system the circuit is as previously described except that the interrupter, being unnecessary, is shunted by closing switch 38.

It will be noted that the construction shown herein employs a plurality of loosely held discs or diaphragms, at least one of which is susceptible to magnetic influence and is in the field of the intermittently energized coil. When the coil attracts and then releases these discs there is a mechanical clashing of the discs, thereby producing a sound which is considerably different from the sound produced by a buzzer, by a vibrating diaphragm such as in a telephone receiver, or by a motor driven or magnetically operated automobile horn. Such diaphragms are rigidly held and emit a more true harmonic sound than is the case where a violent clashing is set up by the rattling of free discs of the type shown herein. This rattling and clashing of the discs produces the sound which more closely simulates the escape of exhaust steam and the exhaust of a steam locomotive is realistically produced.

The contact 40 on the end of the toy connecting rod and reciprocable within the limitation steam chest from movement of the cross head 41 driven by the wheels of the locomotive, synchronizes the circuit control with respect to the speed of the locomotive. There is a direct analogy between this arrangement of parts and the exhaust steam control of a locomotive. Consequently the ratio of contact to operate the sound reproducing means will vary in direct proportion to the speed of the locomotive and the sound simulating the exhaust of steam will be correctly timed at all speeds.

I claim:

1. The combination with a toy steam type locomotive, of electrically operated sound producing means simulating exhaust of steam from the cylinders of a locomotive in motion, an operating circuit therefor, and means for intermittently closing said circuit in timed relation to the speed of the locomotive.

2. In an electrically driven toy steam type locomotive, electro-magnetic sounding means for simulating the exhaust of steam, an electrical circuit including said sounding means, and means controlled from a movable ele-

ment of the locomotive for intermittently opening and closing said circuit.

3. A sound producing attachment for toy steam type locomotives, comprising an electrically operable sounder for simulating the exhaust of steam, a switch movable to open and close an electrical circuit to the sounder, and means for moving said switch through movement of a wheel of the locomotive.

4. In combination, a toy steam type locomotive, electrically operated sounding means for simulating exhaust of steam from cylinders of a locomotive in motion, an operating circuit therefor including said sounding means and a fixed contact, and a movable contact in said circuit operable by movement of the locomotive to intermittently engage said fixed contact for closing said operating circuit for the sounding means.

5. In combination, a toy steam type locomotive having a member reciprocable therein as the locomotive moves, electrically operated sounding means for simulating exhaust of steam from the cylinders of a locomotive in motion, an operating circuit therefor, and means whereby said circuit is intermittently closed by said reciprocable member during its movement.

6. The combination with an electrically driven toy steam type locomotive, of electrically operated sound producing means operable to simulate exhaust of steam from cylinders of a locomotive in motion, an operating circuit for the same, a single source of current supply for driving the locomotive and operating the sound producing means, and a make and break contact in the sound producing circuit operable by a moving part of the locomotive in timed relation to the speed thereof.

7. The combination with a toy steam type locomotive, of electrically operated sound producing means, an operating circuit for the same, and means for automatically and intermittently making and breaking said circuit to simulate the intermittent sound of exhaust of steam from the cylinders of a locomotive.

8. The combination with an electrically driven toy steam type locomotive, of electrically operated sound producing means, an operating circuit for the same, a single source of current supply for driving the locomotive and operating the sound producing means, and means for automatically and intermittently making and breaking the sound producing circuit to simulate the intermittent sound of exhaust of steam from the cylinders of a locomotive.

9. The combination with a toy steam type locomotive adapted to be driven from a track current supply, electrically operated sound producing means for simulating exhaust of steam from cylinders of a locomotive in motion, an operating circuit for said sound producing means receiving its current from the track supply, and said operating circuit including an interrupter and a selectively operable shunt circuit whereby the sound producer can be operated by either direct or alternating current.

10. The combination with a toy steam type locomotive, of sound producing means including closely spaced separate substantially free diaphragms, and electrically operated means to rapidly vibrate said diaphragms to simulate the sound of exhaust steam from the cylinders of a locomotive.

11. The combination with a toy steam type locomotive, of sound producing means including a plurality of loosely held superposed discs, and means to rapidly vibrate said discs to cause a mechanical clashing thereof producing non-harmonic vibrations simulating the sound of exhaust steam from the cylinders of a locomotive.

12. The combination with a toy steam type locomotive having an intermittently energized coil, of sound producing means including a plurality of loosely held superposed diaphragms, and at least one of said diaphragms being susceptible to magnetic influence and disposed in the field of the coil to cause rapid vibration and mechanical clashing of the diaphragms to simulate the sound of exhaust steam from the cylinders of a locomotive.

In testimony whereof I affix my signature.

HARRY R. HOWSER, JR.