Nov. 15, 1932. E. D. BOISSELIER 1,887,988

BELL RINGING DEVICE FOR TOY LOCOMOTIVES

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Fig. 1.

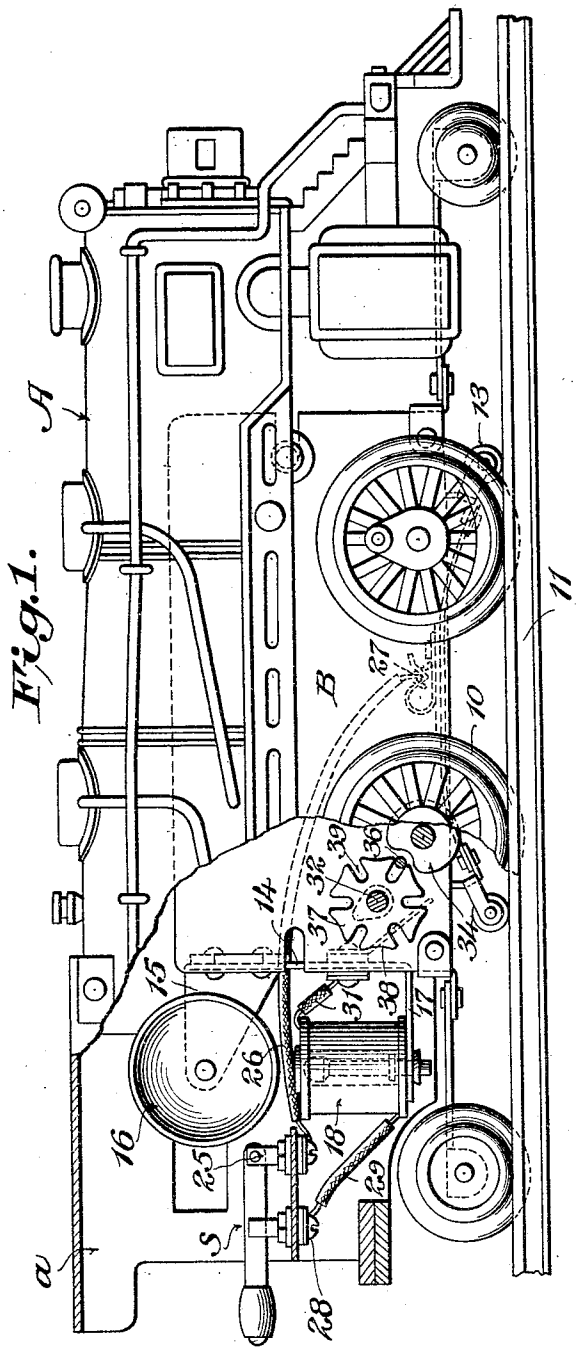
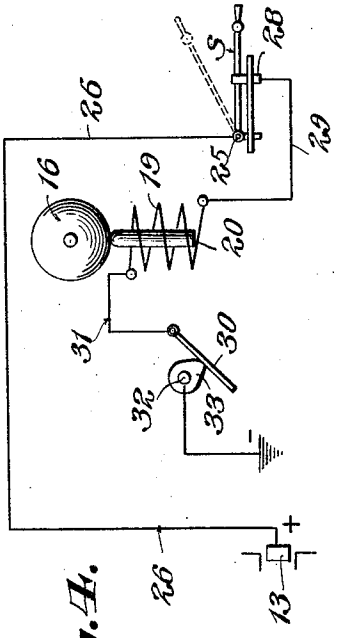


Fig. 4.



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Fig. 3.

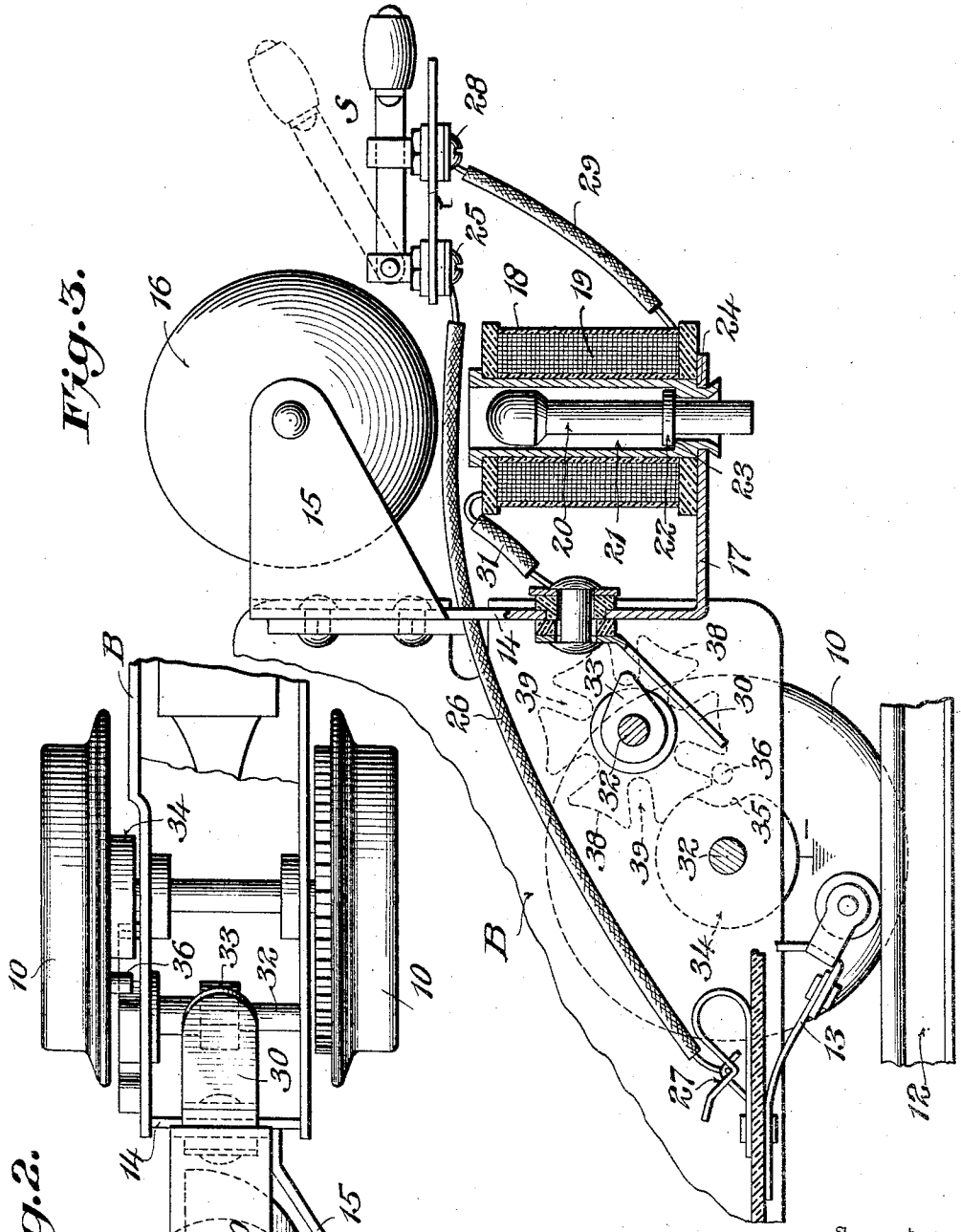


Fig. 2.

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UNITED STATES PATENT OFFICE

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BELL RINGING DEVICE FOR TOY LOCOMOTIVES

Application filed June 17, 1932. Serial No. 617,895.

This invention relates to a novel bell ringing device for use on toy electric locomotives, and has generally in view to provide a simple, inexpensive, thoroughly reliable and efficient device of this character which may readily be embodied in toy electric locomotives as at present constructed without material alterations thereto, and which is effective in operation to simulate closely the ringing of the bells of large passenger an freight service locomotives.

A special object of the invention is to provide a simple, compact bell ringing device which may readily be mounted within the relatively restricted available space within toy locomotive housings of present commercial types, and which is effective in operation to produce an exceptionally quick blow of the clapper against the bell thereby to produce a distinct, sharp ringing of the bell.

Another object of the invention is to provide a bell ringing device which may readily be rendered operative and inoperative simply by closing and opening a small electric switch located within the cab or any other suitable place on the locomotive.

Heretofore, bell ringing devices used on toy locomotives have had the disadvantage of ringing the bell with too short an interval of time between successive soundings of the bell, with the result that the ringing of the bell has not satisfactorily simulated the bell of a large locomotive. Accordingly, another object of the invention is to provide a bell ringing device for toy locomotives embodying a simple construction which is effective to more nearly simulate the sound effect of the bells of large locomotives than has heretofore been obtained in toy devices.

Generally speaking, the objects of the invention are attained providing an electrically actuated bell clapper and a simple yet novel mechanical control mechanism operated by movement of the locomotive to open and close the circuit of the electrical means for actuating the clapper.

With the enumerated and various other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the drawings, wherein like characters of reference denote corresponding parts in the different views:—

Figure 1 is a side elevation of a toy electric locomotive equipped with a bell ringing device according to one practicable embodiment of the invention, parts being broken away to more clearly disclose the underlying structure.

Figure 2 is a bottom plan view illustrating the mechanical control means for the electric circuit in which the bell clapper is included.

Figure 3 is an enlarged elevation, partly in section, of the bell ringing unit; and

Figure 4 is a wiring diagram of the device.

Referring in detail to the practical embodiment of the invention illustrated in the drawings, A designates, generally, a toy electric locomotive of a well known commercial type including, as usual, a motor unit frame, designated generally as B, carrying a motor (not shown) which is understood to be geared to the drive wheels 10 for turning the same thereby to produce travel of the locomotive along the track rails 11, operating current for the motor being supplied from a third rail 12 through a trolley 13 mounted on the frame of the motor unit.

The rear end of the frame B of the motor unit constitutes the front end of the locomotive cab *a*, and in accordance with the invention the present bell ringing device is mounted in part on the rear end of the frame B so as to occupy available space within the cab *a*. It is pointed out in this connection, however, that it is by no means essential that any of the parts of the bell ringing device be mounted as illustrated in the drawings, but that, in the contrary, the parts of said device may be mounted wherever appropriate or most convenient, depending upon the structural characteristics of the particular toy locomotive in which the device is embodied.

In the present instance a bracket 14 is riveted or otherwise suitably secured to the rear

end of the frame B of the motor unit and has extending rearwardly therefrom an upper arm 15 on which is mounted a bell 16, and a lower arm 17 on which is mounted a solenoid 18 inclusive of a winding 19 and a reciprocal core 20 constituting a clapper or striker for the bell 16.

The construction and the mounting of the solenoid 18 constitutes in itself a novel feature of the invention in that a central tube 21 constituting a guide for the core 20 and around which the winding 19 is disposed, is formed as a means of fastening the solenoid to the bracket arm 17 and also for cooperation with the core 20 to support the latter normally in a position spaced from the bell 16 for projection thereagainst when the solenoid is energized. The solenoid is supported vertically beneath the bell 16 with the core 20 alined with the bell whereby the core is projected upwardly to strike the bell upon energization of the solenoid and drops by gravity to a normal position spaced from the bell when the solenoid is deenergized. In this connection it will be observed that the core 20 is formed near its lower end with a lateral projection 22 in the form of an annular flange and that the tube 21 is interiorly shouldered as at 23 to provide a stop to be engaged by the projection 22 to limit downward movement of the core. Consequently, whenever the solenoid is deenergized the core 20 gravitates to a normal position of rest with the projection 22 engaging the shoulder 23 and with the upper headed end of said core spaced appropriately from the bell 16. At its lower end the tube 21 is formed of reduced exterior diameter to extend downwardly through an opening in the bracket arm 17 and to provide a shoulder 24 to seat against the upper face of said bracket arm. The reduced lower end of the tube is of appropriately greater length than the thickness of the bracket arm to extend below said arm, and the solenoid is secured rigidly to the bracket arm simply by spreading the lower reduced end of the tube 21 outwardly as clearly illustrated in Fig. 3.

Mounted within the cab *a* or at any other suitable location on the locomotive is a small manually operable electric switch of any suitable type designated generally as S and illustrated in the present instance as being of the knife blade type. One terminal 25 of this switch is connected by a conductor 26 with the trolley 13 preferably through a clip 27, and the other terminal 28 of said switch is connected by a conductor 29 with one end of the solenoid winding 19. Thus, assuming current to be supplied through the trolley to the conductor 26, and the switch S to be closed, it is apparent that upon grounding of the other end of the solenoid winding a circuit through the solenoid is completed with consequent energization of the same and projection of the core or clapper 21 upwardly against the bell 16. On the other hand, when the switch S is open, grounding of the last mentioned end of the solenoid winding obviously is ineffective to cause energization of the solenoid. Means are provided for intermittently grounding the last mentioned end of the solenoid winding at all times during movement of the locomotive. Thus, the switch S constitutes manually operable means whereby the bell ringing device may readily be rendered operative and inoperative, since closing of the switch is essential to completion of the solenoid circuit whereas, when said switch is open, the circuit is not completed despite the periodic grounding of the end of the solenoid winding opposite the end thereof that is connected to the switch.

Novel means is provided for periodically grounding and thereby closing the solenoid circuit during movement of the locomotive when the switch S is closed. This means comprises in the present instance a yieldable arm 30 mounted on the bracket 14 and insulated therefrom, a conductor 31 connecting said arm with the end of the solenoid winding opposite the end thereof to which the conductor 29 is connected, a grounded shaft 32 mounted in the motor frame B and geared to the locomotive driving means for rotation during movement of the locomotive either forwardly or backwardly, and a projection 33 on said shaft disposed to wipe against the arm 30 once during each complete rotation of the shaft 32 thus to ground and complete the solenoid circuit with consequent projection of the core or clapper 20 against the bell 16.

As heretofore stated, prior bell ringing devices have had the disadvantage of effecting ringing of the bell with too short a time interval between successive soundings of the bell. To avoid this disadvantage the present invention employs a simple driving means for the shaft 32, operated by the motor unit of the locomotive, whereby the bell is sounded only once during a plurality of complete rotations of the drive wheels of the locomotive. Thus, even when the locomotive is running at maximum speed there is obtained a distinct pause between successive soundings of the bell, which pause is predetermined according to the normal speed of travel of the locomotive so that the time interval between successive soundings of the bell closely approximates the ordinary pause between the successive sounding of the bell of a large locomotive.

The driving means for the shaft 32 comprises in the present instance a Geneva gear including a disk 34 carried either by one of the drive wheels 10 or by one of the drive wheel axles, and provided with a peripheral recess 35, a pin 36 fixed with respect to said disk and disposed outwardly thereof in radial alinement with the recess 35, and a

wheel 37 fixed to the shaft 32 in the plane of the disk 34, said wheel having a plurality of peripheral depressions 38 evenly spaced circumferentially thereof and curved corresponding to the periphery of the disk 34 to receive said disk, and also having, between each adjacent pair of the depressions 38, a radial slot 39 to receive the pin 36.

During the major part of each complete rotation of the disk 34 its periphery engages one of the peripheral depressions 38 of the wheel 37 and thereby holds said wheel and the projection 33 against rotation, but at a certain time during rotation of said disk 34 the pin 36 enters an adjacent slot 39 and thereby imparts partial rotation to the wheel 37, which rotation is permitted by the recess 35 in the disk. In other words, continuous rotation of the disk 34 obviously results in step-by-step partial rotation of the wheel 37 and the projection 33, one step for each complete rotation of the disk and with the angularity of the successive steps dependent upon the number of the depressions 38 and slots 39 in the wheels. In the present instance the wheel 37 has six depressions and slots. Therefore, six complete rotations of the disk 34 are necessary to produce one complete rotation of the shaft 32 and the projection 33 and a single ringing of the bell, since the projection 33 engages the arm 30 and closes the solenoid circuit to project the core or clapper 20 only once during each complete rotation of the wheel 37. The number of depressions and slots in the wheel 37 may be made gerater or less than six so as to require more or less than six complete rotations of the disk 34 to produce one complete rotation of the projection 33. Consequently, when the normal speed of the locomotive is known it is a very simple matter to construct the wheel 37 so as to obtain successive soundings of the bell at desired time intervals.

The projection 33 may be grounded through the shaft 32 and the motor frame in which said shaft is journaled, or it may be grounded in any other suitable manner. In any event, it is apparent that so long as the switch S is closed and the locomotive is in motion the solenoid circuit will be periodically closed and opened to cause the core or clapper 20 to strike the bell and then drop to its normal position in readiness to again be projected when the solenoid circuit again is closed. On the other hand, it is equally apparent that when the switch S is open ringing of the bell will not occur despite periodic contact of the projection 33 with the arm 30.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:—

1. In a toy locomotive, a bell, a bell clapper, electrical means operable when energized to cause said clapper to strike the bell, an electric circuit including said means, and means operable by movement of the locomotive for periodically closing and opening said circuit.

2. In a toy locomotive, a bell, a bell clapper, electrical means operable when energized to cause said clapper to strike the bell, an electric circuit including said means, means operable by movement of the locomotive for periodically closing and opening said circuit, and means separate from said last mentioned means to render the first named means inoperative.

3. In a toy locomotive, a bell, a bell clapper, electrical means operable when energized to cause said clapper to strike the bell, an electric circuit including said means, and means operable by movement of the locomotive to close and open said circuit once only during an amount of travel of the locomotive produced by a plurality of rotations of the driving wheels thereof.

4. In a toy locomotive, a bell, a bell clapper, electrical means operable when energized to cause said clapper to strike the bell, an electric circuit including said means, a rotatable switch element for closing and opening said circuit, power means for the locomotive including a rotatable element, and a connection between said last mentioned element and said switch element whereby the switch element is rotated only once during a plurality of rotations of the power element.

5. In a toy locomotive, a bell, a solenoid inclusive of a core constituting a clapper to be projected against the bell when the solenoid is energized, an electric circuit including said solenoid, and means operable by movement of the locomotive to periodically open and close said circuit.

6. In a toy locomotive, a bell, a bell clapper, electrical means operable when energized to cause said clapper to strike the bell, an electric circuit including said means, a rotatable switch element for closing and opening said circuit, power means for driving the locomotive inclusive of a rotatable element, and a gear connection between said switch element and the rotatable element of said power means whereby each complete rotation of the latter element produces only partial rotation of said switch element.

7. In a toy locomotive, a bell, a bell clapper, electrical means operable when energized to cause said clapper to strike said bell, an electric circuit including said means, a shaft carrying a switch element operable during each complete rotation of said shaft to once close and open said circuit, power

means for driving the locomotive inclusive of a member rotatable continuously during movement of the locomotive, and a gear connection between said member and said shaft whereby the latter is rotated only once during a plurality of complete rotations of the member.

In testimony whereof I hereunto affix my signature.

EARL D. BOISSELIER.