June 9, 1942. J. L. BONANNO 2,285,645

ELECTROMAGNETICALLY OPERATED RECIPROCATING MECHANISM

Filed Jan. 23, 1940

Fig. 1.

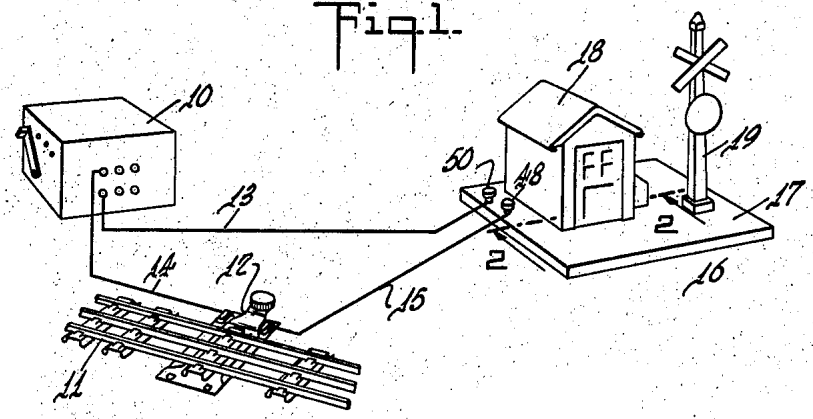


Fig. 2.

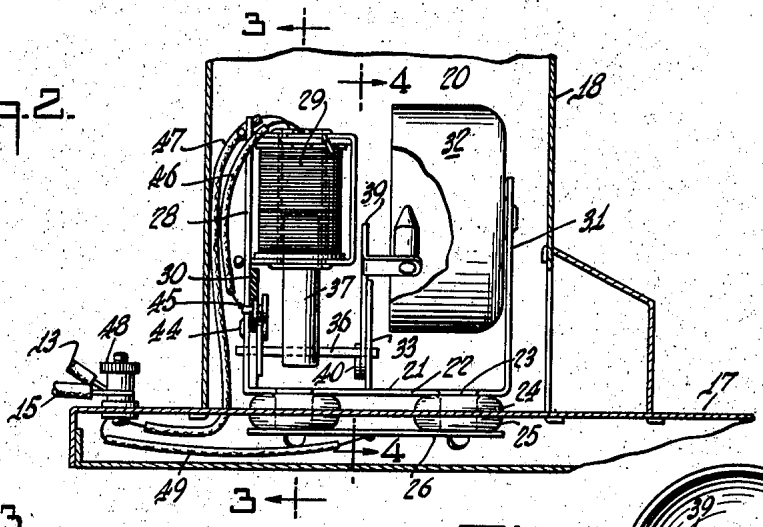


Fig. 3.

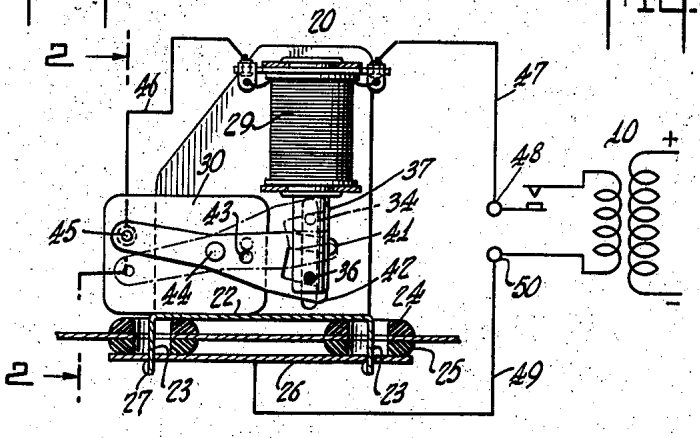
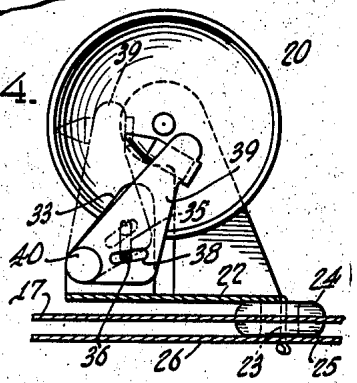


Fig. 4.



INVENTOR
JOSEPH L. BONANNO
BY
Jacob Shiberman
ATTORNEY

Patented June 9, 1942 2,285,645

UNITED STATES PATENT OFFICE

2,285,645

ELECTROMAGNETICALLY OPERATED RECIPROCATING MECHANISMS

Joseph L. Bonanno, Maplewood, N. J., assignor to The Lionel Corporation, New York, N. Y., a corporation of New York

Application January 23, 1940, Serial No. 315,153

5 Claims. (Cl. 177—7)

The present invention relates to electromagnetically operated reciprocating mechanisms, and is more particularly directed toward electrically operated bell mechanisms for use in connection with the operation of toy trains and designed to cause a bell to sound with measured strokes so as to simulate a railroad crossing gong or the like, and to mechanisms of a similar nature where a measured interval is required between cycles of operation.

According to the present invention the ringing mechanism is electromagnetically operated and includes a normally closed switch adapted to be opened during each cycle of operation, as when the bell is to be sounded, and to be automatically closed, for example, after the clapper hits the bell, so that the mechanism is given a succession of impulses so long as current is applied.

The present invention also contemplates that the bell ringing mechanism be mounted in such a way as to afford free vibration of the bell and its support for improving the quality of the sound produced.

The accompanying drawing shows, for purposes of illustrating the present invention, one of the many embodiments in which the invention may take form, it being understood that the drawing is illustrative of the invention rather than limiting the same.

In this drawing:

Figure 1 is a diagrammatic view illustrating the bell ringing mechanism embodied in an accessory for toy electric trains and operated when the train passes over a predetermined section of track;

Figure 2 is a vertical cross sectional view on the line 2—2 of Figure 1; and

Figures 3 and 4 are vertical sectional views on the lines 3—3 and 4—4, respectively, of Figure 2.

In the drawing a transformer or other source of current is indicated at 10, a length of track at 11 and a circuit closer at 12 adapted to close the circuit when the train passes over the track. Wires 13, 14 and 15 interconnect the transformer and circuit closer with the accessory indicated generally at 16. This accessory has a sheet metal base 17 which carries a shack or other enclosure 18 and a crossing signal 19.

The shack receives the bell mechanism indicated generally by the reference character 20. The parts of this mechanism are secured to a frame 21 of generally U-shaped configuration. The bottom 22 of the frame has downwardly extending projections 23 which pass through soft rubber insulating rings 24 and 25 and a bottom plate 26 where they are twisted, as indicated at 27, so as to secure the frame in place. The frame has one upwardly extending side 28 which supports a solenoid coil 29 and an insulating plate 30. The other side 31 of the frame 21 supports a bell or gong 32. The third upwardly bent element 33 is arranged between the side members 28 and 31. The side member 28 and the upwardly bent element 33 have vertical slots indicated at 34 and 35, respectively, to guide a pin 36 carried on the armature 37.

The pin 36 passes through a slot 38 in a clapper-carrying arm 39 pivoted at 40 to the upwardly bent element 33. The rod 36 also passes through between bifurcations 41 and 42 of a switch arm 43 pivoted at 44. This pivot passes through the frame and grounds the switch arm 43 to the frame. The arm 43 cooperates with a fixed contact 45 carried by the insulating plate 30. This contact is connected by a wire 46 with one side of the coil 29. The other side of the coil 29 is connected by a wire 47 with a binding post 48. The plate 26 is connected by a wire 49 with a binding post 50.

The bell ringing mechanism is normally in the position shown in full lines in Figures 3 and 4. When current is applied the solenoid coil 29 raises the armature 37 and swings the clapper mechanism 39 from the full line position of Figure 4 to the dot-and-dash line position. It also swings the switch arm 43 to the dot-and-dash line position of Figure 3. This opens the circuit. The clapper mechanism rebounds so that the bell sounds and the armature drops to reconnect the coil to circuit. The time required for remaking the circuit is largely dependent upon the lost motion between the bifurcations of the arm and the time required for a freely falling body to traverse that distance. The operation continues as long as current is supplied to the mechanism. Devices other than bells may be operated.

It is obvious that the invention may be embodied in many forms and constructions within the scope of the claims and I wish it to be understood that the particular form shown is but one of the many forms. Various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A bell mechanism comprising a sheet metal frame bottom, two upwardly bent sides and an upwardly bent element between the sides, a bell secured to one of said sides, a solenoid coil secured to the other of said sides, a clapper piv-

otally secured to the upwardly bent element, and a vertically movable armature having a driving connection with the clapper to bring the clapper against the bell when the coil is energized.

2. A mechanism such as claimed in claim 1, having a fixed contact insulatedly supported by the frame and a cooperative movable contact operable by the armature to open and close the circuit.

3. A bell mechanism comprising a frame having a base and an intermediate and two outer upwardly extending elements, a bell secured to one of the outer elements, a bell clapper pivoted to the intermediate element and the other outer element, a solenoid coil carried by the said other outer element, an armature operably connected with the clapper to cause it to strike the bell, and a circuit controlling device in series with the coil and operably connected with the armature to be opened at the end of the clapper actuating movement of the armature so that the coil is deenergized and to be closed when the coil releases the armature, the circuit controlling device including a lever pivoted to said other upwardly extending element.

4. A mechanism such as claimed in claim 3, wherein the armature moves vertically and the clapper tends to fall away from the bell.

5. A mechanism such as claimed in claim 3, wherein the armature has a lost motion connection with the circuit controlling device.

JOSEPH L. BONANNO.