F. J. HUMMEL.

TOY RAILWAY.

APPLICATION FILED FEB. 25, 1915.

1,153,922. Patented Sept. 21, 1915.

FIG. 1

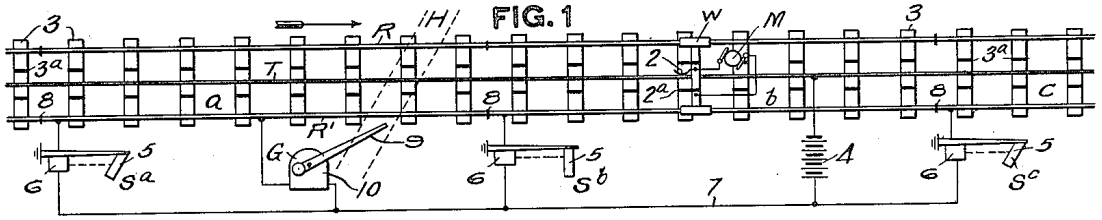


FIG. 2

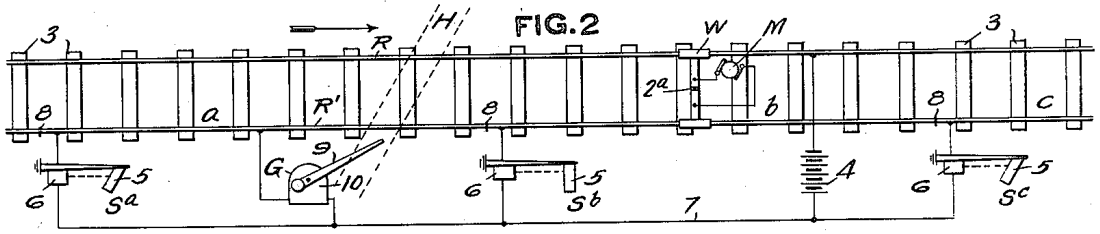


FIG. 3

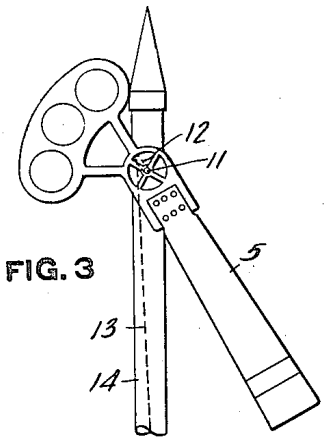


FIG. 4

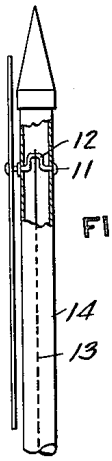


FIG. 7

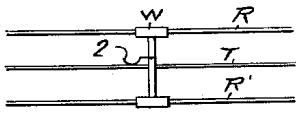


FIG. 5

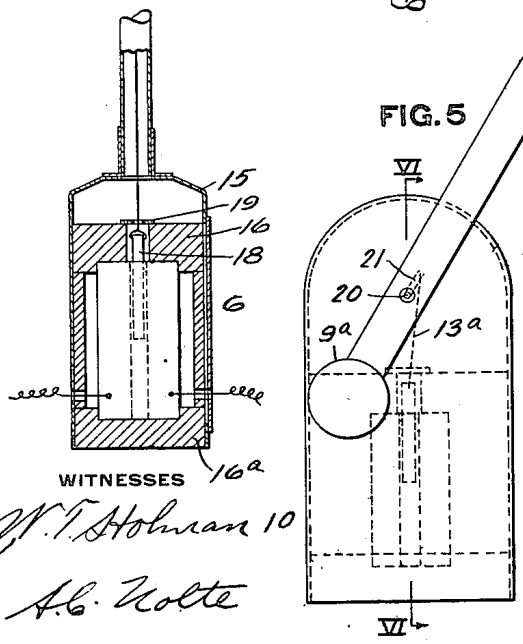
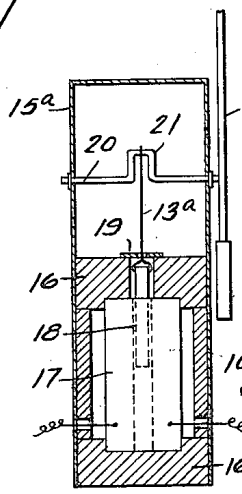


FIG. 6



WITNESSES

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TOY RAILWAY.

1,153,922. Specification of Letters Patent. Patented Sept. 21, 1915.

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To all whom it may concern:

Be it known that I, FRANK J. HUMMEL, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Toy Railways, of which the following is a specification.

My invention relates to toy railways and to signals and signaling systems adapted for use in connection therewith.

I will describe certain forms of toy railways embodying my invention, and certain forms of signals and signaling systems adapted for use in connection therewith, also embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a diagrammatic view showing one form of toy railway and signaling system embodying my invention. Fig. 2 is a diagrammatic view showing a modification of the railway and signaling system shown in Fig. 1 and also embodying my invention. Fig. 3 is a view, partly in section and partly in elevation, showing one form of signal which may be used in the systems shown in Figs. 1 and 2. Fig. 4 is a view, partly in section, showing the upper portion of the signal shown in Fig. 3 on a plane at right angles to that of Fig. 3. Fig. 5 is a view showing one form of crossing gate which may be used in the systems shown in Figs. 1 and 2. Fig. 6 is a sectional view on the plane represented by the line VI—VI in Fig. 5. Fig. 7 is a view showing a mechanically propelled car which may be used in connection with the system shown in Fig. 1.

Similar reference characters refer to similar parts in each of the views.

Referring first to Fig. 1, I have here shown a toy railway comprising two track rails R and R′, and a third rail or trolley T. The track rails and third rail are mounted on ties 3, the third rail being electrically insulated from each track rail by insulations 3^a in the ties.

At least one of the track rails R′ (and as here shown, both of them) is divided into insulated sections *a*, *b*, *c*, etc. by insulated joints 8. The third rail T is electrically continuous throughout the system. Located adjacent the entrance end of the sections *a*, *b*, *c*, etc., are signals S^a, S^b, S^c, etc., each of which may be similar to the signal shown in Fig. 3 and hereinafter described in detail. It is sufficient at the present time to say that each of these signals comprises a semaphore 5 biased to the inclined or "clear" position, and an electric motor 6 for moving it to the horizontal or "stop" position. Extending along the railway is a wire 7 to which is connected one terminal of the motor for each signal. The remaining terminal of each motor is connected with the corresponding section of rail R′.

4 is a source of current, one terminal of which is connected with the wire 7 and the other terminal with the third rail T.

W is a car adapted to travel on the track rails R and R′, which car is provided with a contact finger 2 arranged to make contact with the third rail T. This contact 2 is electrically insulated from the remainder of the car by insulations 2^a. The car is provided with a propelling motor M, the terminals of which are connected respectively with the contact 2 and with the car wheel which rides on the divided track rail R′.

The operation of the apparatus thus far described is as follows: When a block section is unoccupied, the signal for that section indicates clear because its motor circuit is open between the corresponding section of rail R′ and the third rail T. But when a car enters a section, the circuit for the corresponding signal is closed by the car motor and the connections therefrom to the contact 2 and to the car wheel, so that such signal moves to the "stop" position. It will be noted that the car propelling motor and the signal motor are in series and that both are supplied from the single battery 4. It will also be noted that no current is consumed by a signal except when a car is in the block which is guarded by such signal.

In Fig. 1 I have also shown a highway crossing H near the exit end of section *a*, and a gate G guarding this crossing. The gate may be of the type shown in Fig. 4 and described hereinafter; briefly described it comprises a pivotally mounted arm 9 biased to the non-obstructing position, and a motor 10 for moving the arm downward to the obstructing position. The gate motor is connected between the wire 7 and rail section *a*. It will be seen that normally the circuit for the gate motor is open so that the gate arm is in the non-obstructing position, but that

when a car enters block *a* it closes the circuit for the gate motor so that the arm is moved to the obstructing position and remains there as long as the car occupies block *a*. Then after the car passes the highway and enters block *b*, the gate arm returns to the non-obstructing position.

It may be desirable, at times, to operate on the railway shown in Fig. 1, cars which are propelled by a mechanical device such as a spring motor. Such cars usually have metallic wheels and axles, and each car is provided with the contact 2, but this contact is electrically connected with the wheels of the car by omitting the insulations 2^a. A car constructed in this manner is shown in Fig. 7. This car will operate the signals because it will electrically connect the third rail T with the section of the divided rail R′ which the car occupies.

Referring now to Fig. 2, the system here shown is similar to that shown in Fig. 1, the differences being that the third rail is omitted, one track rail R is made electrically continuous, battery 4 is connected with rail R, the two wheels of car W are electrically insulated at 2^a, and the terminals of the car propelling motor M are connected with the two wheels of the car respectively. The ties 3 in Fig. 2 are shown as being of insulating material, which construction can of course be employed in Fig. 1 if desired.

When a block in Fig. 2 is unoccupied, the corresponding signal indicates clear because its circuit is open between the corresponding section of rail R′ and the continuous rail R. When, however, a car enters a block, the circuit for the corresponding signal is closed by the wheels and axle and the car motor M, so that the signal moves to stop position. The gate G operates in the same manner as in Fig. 1. Obviously the signals in Fig. 2 will be operated by a mechanically propelled car having metallic wheels and axles, because such a car will electrically connect the two rails.

The arrangement shown in Fig. 2 has the same advantages as that shown in Fig. 1, viz., only one source of current is required for signaling and car propulsion, and current is drawn from this source for a signal only when a car is in the block guarded by such signal.

It will be noted that each form of my invention thus far described comprises two electrically insulated conductors with which the cars make moving contact, one of which is divided into insulated sections. In Fig. 1, these two conductors are track rail R′ and the third rail T, while in Fig. 2 they are the two track rails. Other forms embodying the same broad idea may suggest themselves to those skilled in the art.

Referring now to Figs. 3 and 4, the signal, in the form here shown, comprises a case 15 to which is attached an upwardly extending hollow tube 14. The semaphore 5 is fixed on a shaft 11 which is pivotally mounted in the upper end of the tube and which is provided with a crank 12. The operating motor 6 comprises a solenoid 17 suitably mounted in blocks 16 and 16^a located in the case 15, in the hollow core of which solenoid is a plunger 18 of magnetizable material. This solenoid is operatively connected with the crank 12 on the semaphore shaft 11 by a cord or wire 13 located within the tube 14. To prevent the plunger from falling out of the solenoid when the signal is tipped upside down, I provide a cap 19 which is attached to the block 16, and which has a hole large enough to allow the cord 13 to pass therethrough but not large enough to admit the plunger. The weight of the semaphore 5 is such that when the solenoid 17 is deënergized the semaphore moves to the inclined or clear position, raising the plunger 18 to the position shown. When the solenoid is energized it draws the plunger down, thus raising the semaphore to the horizontal or stop position against the action of gravity.

The crossing gate G shown in Figs. 5 and 6 is substantially the same in construction as the signal just described. The operating motor 10 is exactly the same as the motor 6 for the signal. The gate arm 9 is fixed to a shaft 20 which is journaled in the case 15^a and which is provided with a crank 21. The crank 21 is connected with the motor plunger by a cord or wire 13^a. The arm 9 is provided with a counterweight 9^a which holds the arm in the non-obstructing position when the motor is deënergized.

Although I have herein shown and described only a few forms of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the spirit and scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. A toy railway and signaling system comprising two conductors with which the cars make moving contact, one of which is electrically continuous and the other divided into block sections, one at least of said conductors being a track rail, a common wire extending along the railway, signals for the sections, each signal being biased to the clear position and comprising a motor for moving it to the stop position, the motor for each signal being connected between the common wire and the corresponding section of the divided conductor, a source of propulsion and signal-operating current connected between said common wire and said continuous conductor, a car having insulated contacts adapted to make contact with said two conductors respectively, and said car

having a propelling motor whose terminals are connected respectively with said contacts.

2. A toy railway and signaling system comprising track rails one at least of which is divided into block sections, a third rail electrically continuous throughout the system but insulated from the said divided track rail, a common wire extending along the railway, signals for the sections, each signal being biased to the clear position and comprising a motor for moving it to the stop position, the terminals of each motor being connected with the common wire and the corresponding section of the divided track rail, a source of current connected between said common conductor and the third rail, and a car adapted to travel on the track and to form an electrical connection between the third rail and the divided track rail.

3. A toy railway and signaling system comprising three conductors two of which are electrically continuous and the other divided into block sections, a source of signaling and propulsion current connected between the two continuous conductors, signals for the sections each signal being biased to the clear position and comprising a motor for moving it to the stop position, the motor for each signal being connected between one continuous conductor and the corresponding section of the divided conductor, a car having insulated contacts adapted to make contact respectively with the other continuous conductor and the sections of the divided conductor, and said car having a propelling motor whose terminals are connected respectively with said contacts.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK J. HUMMEL.

Witnesses:
A. L. VENCILL,
A. C. NOLTE.