DRAW BRIDGES FOR MODEL RAILROADS

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This invention relates to draw bridges for model railroads. It is the principal object of the present invention to provide a draw bridge for model railroads which is simple in construction and reliable in operation. It is a further object of the present invention to provide a draw bridge for model electric railroads which can be incorporated in a track layout and which can be manually or automatically operated, as desired. It is a further object of the present invention to provide a draw bridge for model electric railroads in which the closed condition of the bridge can be utilized for controlling the energization of approach track sections at each end of the bridge. It is a further object of the present invention to provide a draw bridge for model railroads having a pair of bridge leaves which are simultaneously operated. It is a further object of the present invention to provide a draw bridge for model railroads having a pair of bridge leaves which are interconnected in the manner of the bridge leaves included in the invention hereinbefore provided. It is a further object of the present invention to provide a draw bridge for model railroads having a pair of bridge leaves interconnected in the manner of the draw bridge leaves hereinbefore provided.

The track layout can be provided with the customary track sections T1 and T2 and preferably has electrically insulated approach track sections T3 and T4 between which electrically insulated track sections T5 and T6 on the leaves L1 and L2 of the bridge B are aligned. The rails of one of the track sections, such as the track section T1, are preferably connected by conductors 10 and 11, to any suitable source of electrical energy, and preferably of controlled polarity, to permit reversal or controlled directional movement of the electrical locomotive.

The track sections T1 and T2 can be electrically isolated from the track sections T3 and T4 by gaps 12 in the rails, the track sections T3 and T4 being similarly electrically isolated and mechanically separated from the bridge track sections T5 and T6 by gaps 13 at the outer ends of the rails of the bridge track sections T5 and T6 which permit the upward swinging of these track sections as hereinafter pointed out. The track sections T5 and T6 are similarly electrically isolated and mechanically separated at their inner ends by gaps 14.

The track sections T1 and T3 preferably have one of their rails electrically connected to the aligned rail of the track sections T5 and T6 by a conductor 15 and the track section T1 preferably has the other of its rails electrically connected to the aligned rail of the track sections T5, T6, T4 and T2 by a conductor 16.

The approach track section T3 has the other of its rails connected for energization by a conductor 17 extending through separable contacts C1 to the conductor 16 and the approach track section T4 has one of its rails connected for energization by a conductor 18 extending through separable contacts C2 to the conductor 15.

Referring now more particularly to FIGS. 1 to 6, inclusive, the bridge B is therein illustrated as including a base plate 20 with a rim 21 extending downwardly therefrom and with a bottom closure plate 22 secured thereto. The base plate 20 has a pair of openings 23 and an opening 24 therethrough for purposes to be explained.

Spaced end abutments 25 and 26 are provided secured to the base plate 20 and a center or intermediate abutment 27 is secured to the base plate 20 if two leaves are employed. For a dual leaf construction, leaves L1 and L2 are provided hingedly mounted at their outer ends on the end abutments 25 and 26, respectively, by hinges 28. The leaves L1 and L2 are supported at their inner ends in lowered positions on the center abutment 27.

The leaves L1 and L2, for purposes of illustration, are shown as comprising floor sections 30 preferably of insulating material and simulated side girder sections 31 rigidly secured to the floor sections 30.

The rails of the track sections T5 and T6 are preferably permanently secured to the floor sections of the respective leaves L1 and L2.

Each of the floor sections 30 has secured thereto and extending downwardly therefrom an actuating lever 33 with a plate 34 hingedly secured thereto by a hinge 35. Each of the levers 33 has an insulated contact 36 (see FIGS. 4 and 5) respectively forming part of the contacts C1 and C2 (see FIG. 7) and connected respectively to the conductors 16 and 15, as previously explained.

Each of the abutments 25 and 26 also has secured thereto a flexible or spring contact strip 37 in engagement with the respective contact 36 when the leaves L1 and L2 are in their downward or horizontal positions, the contacts 36 being separable from the spring contacts 37 upon upward swinging movement of the leaves L1 and
The spring contacts 37 are connected by conductors 17 and 18 to the approach track sections T3 and T4. The base plate 20 has a side extension 39 upon which a motor 40 is mounted, the motor 40 being disposed within a housing 44 carried by the base plate 20. The motor 40 is connected by a built-in speed reducer 42 to a driving shaft 43. The shaft 43 has a crank disk 44 secured thereto with a crank pin 45. An actuating arm 46 is pivotally mounted on the pin 45, and is pivotally connected at its opposite end by a pivot pin 47 to a central actuating arm 48. The rod 46 is made in two sections, one such as 46a in threaded engagement with the other 46b for adjustment of the length thereof. The actuating arm 48 is pivotally mounted on a supporting shaft 49 extending downwardly from the under side of the base plate 20 and preferably disposed below the central abutment 27. The arm 48, at one end thereof, has an actuating rod 50 pivotally connected thereto and extending therefrom into pivotal engagement with the respective plate 34 where it is held by nuts 51a. The actuating rod 50 is adjustable in length and for this purpose has an externally threaded sleeve 50b with which a threaded rod section 50c is in engagement and with a lock nut 50d disposed thereon for retaining the adjusted length.

The opposite end of the actuating arm 48, at one end thereof, has an actuating rod 51 pivotally connected thereto and extending therefrom into pivotal engagement with the respective plate 34 where it is held by nuts 51a. The actuating rod 51 is adjustable in length and for this purpose has an internally threaded sleeve 51b with which threaded rod sections 51c and 51d are in engagement and with lock nuts 51e disposed thereon for retaining the adjusted length.

Mounted on the lower face of the base plate 20, spaced switches 52 and 53 are provided. The switches 52 and 53 are of conventional type with normally closed contacts, movable to open positions by actuating buttons 54. Actuator heads 55 are adjustable mounted in threaded engagement with the actuating buttons 54 for alternate engagement with the actuating buttons 54 and lock nuts 56 are provided for retaining the actuator heads 55 in the desired adjusted position.

Referring now more particularly to FIG. 5, conductors 60 and 61 are provided, connected to any suitable source of electrical energy, the conductor 60 being connected directly to the motor 40. The base plate 20 for facilitating the making of the circuit connections is preferably provided with a connector mounting strip 62. The conductor 61 is connected through the mounting strip 62 to a conductor 63 extending to one side of a manually operable reversing switch 64. The reversing switch 64 has a conductor 65 extending therefrom, through the mounting strip 62, to one of the leads of the switch 52 and one of the leads of the switch 53 and to the motor 40.

The reversing switch 64 also has a centrally located contact 66 connected by a conductor 67 through the contact strip 62 to one of the contacts of the switch 52. A contact 68 is provided, connected by a conductor 69 through the contact strip 62 to one of the leads of the switch 53.

The mode of operation will now be pointed out.

Power is supplied to the leads 60 and 61, and in accordance with the positioning of the reversing switch 64 and the condition of the switches 52 and 53, one of which will have its contacts open at each of the limit positions of the leaves L1 and L2, the bridge is ready for operation. Assuming that the bridge leaves L1 and L2 are in their lower or horizontal positions, the contacts of the switch 53 will be open and the contacts of the switch 52 will be closed. If it is desired to raise the leaves L1 and L2, the reversing switch 64 has the blade thereof moved to the upward position, and energy is supplied for actuating the motor 40 through a circuit which can be traced as follows: from the lead 61 through the contact strip 62 and conductor 63, the contact 66, conductor 67, closed contacts of switch 52, conductor 65, to the motor 40. The lead 60 is connected directly to the motor 40.

Rotation of the motor 40 continues until the actuating arm 48 has moved the actuator head 55 to a position to open the contacts of the switch 52, whereupon the power supplied to the motor 40 is interrupted at the contacts of the switch 52, so that the motor 40 stops.

If, now, it is desired to lower the leaves L1 and L2, the position of the reversing switch 64 is moved to the opposite position and energy is again supplied for actuating the motor 40 through a circuit which can be traced as follows: from the power lead 61 through conductor strip 62, conductor 63, contact 66, conductor 69, closed contacts of switch 53, and conductor 65 to the motor 40.

Rotation of the motor 40 continues until the energy supply therefor is interrupted by the opening of the contacts of the switch 53 upon engagement of the actuator head 55 with its actuating button 54. The cycle of opening and closing can be repeated as often as desired, the switch 64 being manually or automatically controlled.

Rotation of the motor 40 is effective through the shaft 43 for rotating the crank disk 44, which, through the rod 46, oscillates the actuating arm 48.

Upon movement of the actuating arm 48 in a clockwise direction, the actuating rods 50 and 51 are moved to urge the actuating arms 33 towards each other, reverse, by the engagement of their ends in the plates 34, giving the leaves L1 and L2 upwardly about the pivotal axes provided by the hinges 28. As the actuating arm 48 moves in a clockwise direction, a limit position is reached at which the actuating head 55 engages the button 54 of the switch 52 and causes the contacts of that switch to be broken, thereby deenergizing the motor 40, as previously explained.

Upon movement of the reversing switch 64 to its opposite position, as previously explained, the motor 40 is again energized and rotation of the shaft 43 is effected in the same direction as before for actuating the crank disk 44 to move the actuating arm 48 in a counter-clockwise direction. Upon counterclockwise movement of the arm 48, the actuating rods 50 and 51 are moved in the opposite direction from that previously explained, so that the leaves L1 and L2 move downwardly about the pivotal axes provided by the hinges 28 to their horizontal positions. It will be noted, as illustrated in FIG. 5, that when the leaves L1 and L2 are in their downward positions the contacts 36 and 37 of the contacts C1 and C2 are in engagement so that energy is supplied through the conductors 17 and 18 to the approach track sections T3 and T4. When the leaves L1 and L2 are raised, the contacts 36 are separated from the contacts 37 so that the approach track sections T3 and T4 are deenergized.

1 claim:

A draw bridge for model electric railroads comprising a horizontally disposed hollow elongated base, spaced end abutments mounted on said base at opposite ends thereof and each having a central opening, a central abutment mounted on said base intermediate said end abutments, said base having an elongated space extending beneath said end abutments, a pair of bridge leaves having track rails thereon, said bridge leaves having inner and outer ends and said inner ends being engageable on upper portions of said central abutment, pivotal mounting members connecting the outer ends of said bridge leaves and said end abutments, each of said bridge leaves at its outer end having a pivoting lever extending downwardly therefrom and movable within one of said end abutment central openings, an electric motor mounted on said base at one end thereof and having a vertical shaft, a crank disposed in said elongated space at one end thereof and connected to said shaft in driven relation, an actuating arm in said space intermediate.
said ends pivotally mounted on a vertical pivot for oscillatory movement in a horizontal plane, an actuating rod in said space connecting said crank and said actuating arm for oscillating said actuating arm, and links pivotally connected to opposite ends of said actuating arm and to said actuating levers and disposed in said space in said base for simultaneously raising and lowering said bridge leaves.

2. A draw bridge for model railroads as defined in claim 1 in which a motor actuating circuit is provided for said motor, and limit switches are provided in said circuit and disposed in said space for interrupting the power supply to said motor at the limit positions of said leaves.

3. A draw bridge for model railroads as defined in claim 1 in which a motor actuating circuit is provided for said motor, and limit switches are provided in said circuit and disposed in said space for interrupting the power supply to said motor at the limit positions of said leaves, and switch means is provided for bypassing said limit switches in their open positions.

4. A draw bridge for model electric railroads as defined in claim 1 in which approach track sections are provided aligned with the opposite outer ends of the track rails of said leaves, and contacts are provided controlled by the movement of said levers for controlling the energization of said approach track sections.

5. A draw bridge for model railroads as defined in claim 1 in which a motor actuating circuit is provided for said motor, and manually operable switch members are provided in said motor circuit for energizing said motor for movement of said leaves from either limit position to the other limit position thereof.

6. A draw bridge for model electric railroads comprising a horizontally disposed hollow elongated base plate having downwardly extending rim portions, spaced end abutments mounted on said base plate at opposite ends thereof and each having a central opening, a central abutment mounted on said base plate intermediate said end abutments, said base plate and said rim portions providing an elongated space extending beneath said end abutments, a pair of bridge leaves having track rails thereon, said bridge leaves having inner and outer ends and said inner ends being engageable on upper portions of said central abutment, horizontally disposed hinge members connecting the outer ends of said bridge leaves and said end abutments for raising and lowering the inner portions of said leaves with respect to said central abutment, each of said bridge leaves at its outer end having an actuating lever extending downwardly therefrom and movable within one of said end abutment central openings, an electric motor mounted on said base at one end thereof and having a vertical shaft extending into said elongated space, a crank disposed in said elongated space at one end thereof and connected to said shaft in driven relation, an actuating arm in said space intermediate said ends pivotally mounted on a vertical pivot for oscillatory movement in a horizontal plane, an actuating rod in said space connecting said crank and said actuating arm for oscillating said actuating arm, links pivotally connected to opposite ends of said actuating arm and to said actuating levers, said links extending from said actuating arm and in said space and extending through said base plate for simultaneously moving the inner ends of said bridge leaves with respect to lower limit positions with said inner ends resting on said central abutment and upper limit portions with said inner ends separated from and above said central abutment.

7. A draw bridge for model railroads as defined in claim 6 in which a motor actuating circuit is provided for said motor, and limit switches are provided in said circuit and disposed in said space for interrupting the power supply to said motor at the limit positions of said leaves.

8. A draw bridge for model railroads as defined in claim 6 in which a motor actuating circuit is provided for said motor, limit switches are provided in said circuit and disposed in said space on opposite sides of and actuated by said actuating arm for interrupting the power supply to said motor at the limit positions of said leaves, and switch means is provided for bypassing said limit switches in their open positions.

9. A draw bridge for model electric railroads as defined in claim 6 in which approach track sections are provided aligned with the opposite outer ends of the track rails of said leaves, and contacts are provided controlled by the movement of said levers for controlling the energization of said approach track sections.

10. A draw bridge for model railroads as defined in claim 6 in which a motor operating circuit is provided for said motor and manually operable switch members are provided in said motor circuit for energizing said motor for movement of said leaves from either limit position to the other limit position thereof.

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