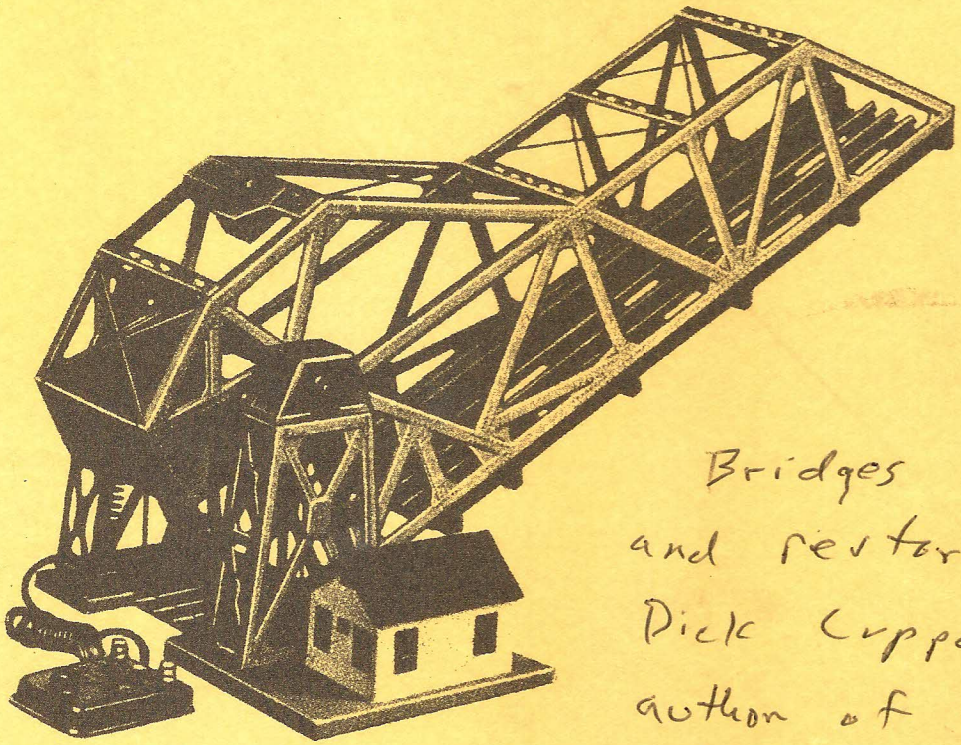
Lionel No. 313 Bascule Bridge

Maintenance and Repair Instructions

Installation Instructions



Bridges serviced and restored by Dick Cuppold the author of this TCA ARTICLE on 313 Bridges.

And

Other Information

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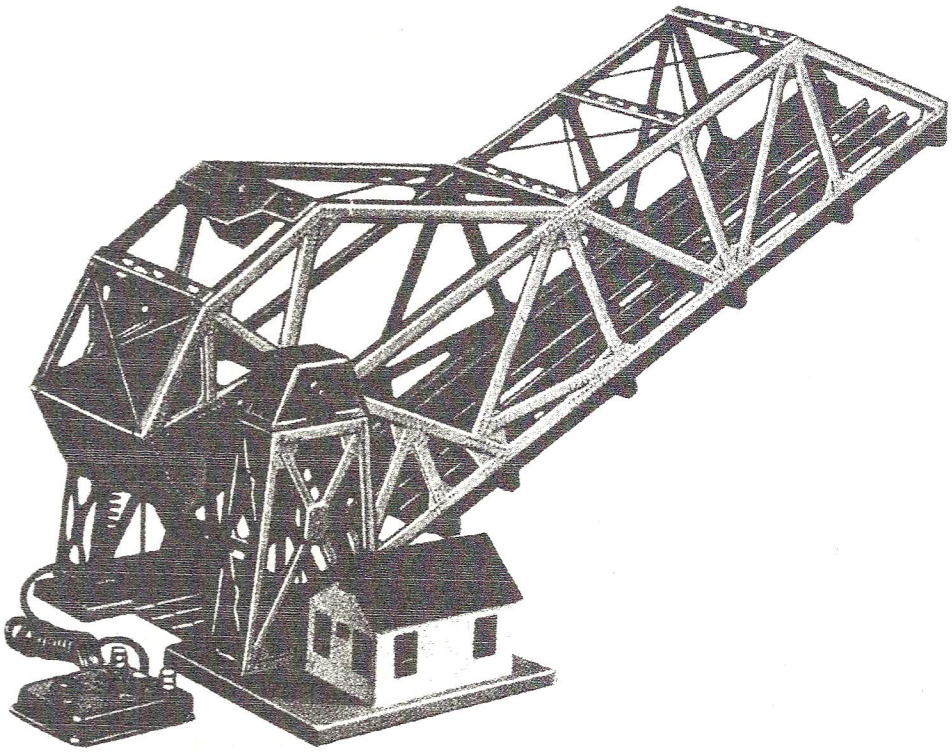

And

Other Information

The LIONEL No. 313 ELECTRIC BASCULE BRIDGE, illustrated on the front cover, was one of the most popular accessory ever manufactured. When the remote control button is pressed, the bridge slowly lifts open, halting the approaching train. After a few seconds, the bridge lowers, and the train automatically started up to continue its trip. The Bridge is constructed of heavy gauge steel with deeply-embossed rivets, plates and other structural details. The motor is enclosed in the bridge-tender's shack. A steel alignment frame is provided in order that the bridge can be used on an even floor level without the need of grade approaches and allows the bridge to span actual model gulf or chasm. The bridge can be used with either "O-27" or "O" gauge trains. The dimensions are: 21½" long, 9¼" high closed.

INTRODUCTION

The documentation herein was reproduced from original Lionel documentation. When this project was started, the original intent was to produce a document that was easy to read for failing eyes like mine and to make it in large enough type so that it could be read easily. The material that I had to work with was small type and many generation photo-copy. The project turned out to be more difficult than I had expected.

If it were not for some fine graphics put together by draftsmen and graphic artists, the graphics would have been blurred. Every attempt was made to maintain the original graphics as they were done by the original artists. Well that didn't work. I had to revert to some discolored and powdering drawing in my own file and attempt to clean them up.

One of the graphics differs slightly from the one in the original documentation because the original was just too far gone. I reworked a different drawing to obtain the drawing contained herein. The charts are the original charts but with a lot of rework. The graphics should be very close to the original graphics if not the same.

The text was another major problem. Only a few paragraphs and pages were legible and as a result most of the text had to be retyped. There may be a word or two changed in the process. The page with the parts list has the prices missing. Many of the prices were not on the original page. Rather than do half of a job on the prices, I decided to leave them out.

I could do nothing with the Patent information because it would have been a modification of the original information. If a better copy should turn up, it can be added to the material contained herein.

I hope that anyone who uses this material will get as much from it as I did in reproducing it.

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Electric Bascule Bridge No. 313

For "O" Gauge and "O-72" 'Track, the six No. 313-81 Spacer Screws enclosed in the, envelope must be assembled to the underside of the Bridge at the six points indicated at "B" in Figure 2. If your Track is Lionel "O-27", the Spacer Screws are not required as the track level of the Bridge corresponds to the "O-27" rail height without using the screws.

HOW TO ASSEMBLE THE TRACK ANCHOR FRAME

The Anchor Frame provides correct alignment of the bridge track and the track in the layout.

Slide the frame under the bridge and place the two projecting underneath the base in the holes in the Track Anchor Frame. When the lever of the special Lockon is closed, the adjacent section of Track will then be accurately lined-up with the rails of the bridge. The position of the Track Anchor Frame when correctly assembled is shown in the illustration in Figure 1.

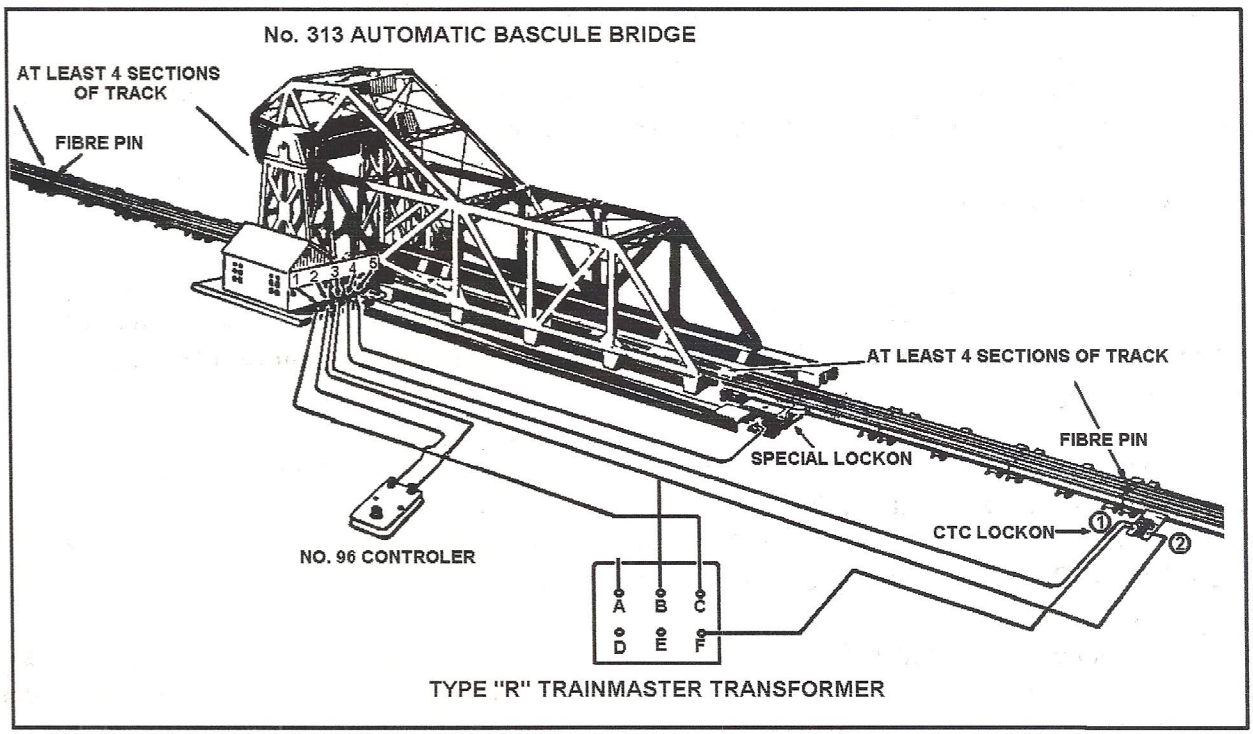

FIGURE 1

TWO INSULATED TRACK BLOCKS REQUIRED

Note that two insulated blocks of Track are use, one at each approach to the Bridge. The purpose of these insulated area is to stop a train when the Bridge is up. An insulated block should be composed of at least three sections of track, but a longer span may be required if the train you are operating has many cars.

To make an insulated block of track, remove the steel pin from the center rail of the track

section at the point where the insulated area begins. Substitute A fibre pin here. Two sizes of fibre pins, "O" Gauge and "O-27", are supplied in the envelope. Use the size appropriate for the pin hole in your track.

When the track has been entirely assembled, and the two insulated blocks made, you are ready to make the connection shown in Figure 1.

HOW TO CONNECT THE BRIDGE

Place Bridge in track layout and make all wire connections shown in Figure 1. This wiring diagram clearly shows the connections running from the five binding posts on the Bridge to (a) the special lockon, (b) the regular track lockon used for operating your train, and the necessary related connections to (c) No. 96C Controller and (d) Type "R" *Trainmaster* Transformer. Follow the wiring diagram carefully and make sure that all connections are made strictly in accordance with diagram.

'This Bridge operates satisfactorily on approximately 12 volt. Although the connections for a Type "R" are shown in Figure 1, the transformer table lists the proper binding posts to use for the various other types of Lionel Transformers. When using *Trainmaster* Transformers having more than one control knob, the connections given in the table utilize one knob for controlling the voltage to the Bridge while the second knob controls the operation of the train. In this case, the pointer of the first knob should be set at approximately 12 volts.

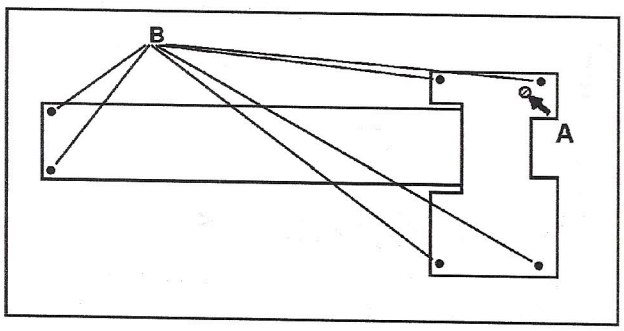

FIGURE 2

OPERATION

When the Bascule Bridge is properly connected, action is as follows. Assume that a train is operating on the track layout and is approaching the Bridge, either side. Press button on No. 96C Controller before train reaches the insulated area. Hold button down only until the bridge starts to rise. Then release the button and consequent operation of the bridge and train will be automatic. Bridge will start to rise, train reaches entrance to bridge and stops because of the dead section. Bridge rises to maximum height then lowers and after the track level is normal again, the waiting train starts up automatically. Motor in bridge will then stop. To repeat cycle of operation, button on No. 96C Controller must be pressed again at the proper time.

This bridge can be used on an even floor level without the need of grade approaches -- or it can be used actually to span a gulf or chasm in the model railroad terrain.

"O-27" LAYOUTS REQUIRE SPECIAL TRACK

A section of "O-27" straight track of special length is provided with each Bascule Bridge. Use this track when constructing an "O-27" layout to balance the opposite side of the oval from

Electric Bascule Bridge No. 313

For "O" Gauge and "O-72" 'Track, the six No. 313-81 Spacer Screws enclosed in the, envelope must be assembled to the underside of the Bridge at the six points indicated at "B" in Figure 2. If your Track is Lionel "O-27", the Spacer Screws are not required as the track level of the Bridge corresponds to the "O-27" rail height without using the screws.

HOW TO ASSEMBLE THE TRACK ANCHOR FRAME

The Anchor Frame provides correct alignment of the bridge track and the track in the layout.

Slide the frame under the bridge and place the two projecting underneath the base in the holes in the Track Anchor Frame. When the lever of the special Lockon is closed, the adjacent section of Track will then be accurately lined-up with the rails of the bridge. The position of the Track Anchor Frame when correctly assembled is shown in the illustration in Figure 1.

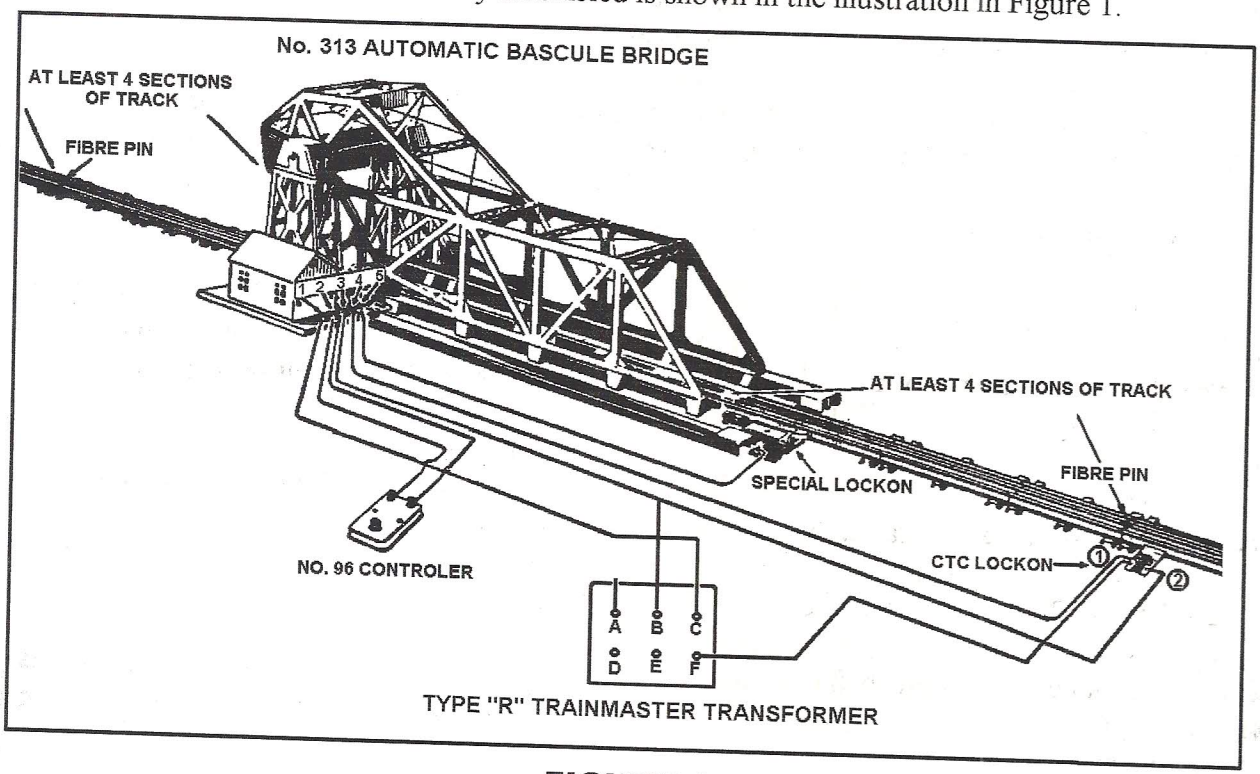

FIGURE 1

TWO INSULATED TRACK BLOCKS REQUIRED

Note that two insulated blocks of Track are use, one at each approach to the Bridge. The purpose of these insulated area is to stop a train when the Bridge is up. An insulated block should be composed of at least three sections of track, but a longer span may be required if the train you are operating has many cars.

To make an insulated block of track, remove the steel pin from the center rail of the track

tile Bridge, otherwise the regular sections of standard length will not fit together tom make a complete circle. (Special section not required with "O" Gauge.)

SPECIAL INSTRUCTIONS

This Bridge is carefully balanced by an extension spring in order to lessen the load on the motor and improve the opening and closing operation. If, after a period of time this spring should "set" in such a position as to affect the counter-balancing , and the motor requires excess voltage, the spring should be tightened to decrease the load on the motor.

LIONEL TRANSFORMERS						
CONNECTIONS	APPROPRIATE BINDING POSTS ON TYPES					
	'B'	'T' or 'K'	'Q'	'R'	'V' or 'Z'	'W'
From Terminal No. 1 of Lockon	X	U	U	F	C	U
From Terminal No. 1 of Bridge	X	F	C	C	A	U
From Terminal No. 3 of Bascule Bridge	B	B	A	B	U	A

The large slotted-head screw which controls the spring tension is indicated at "A" in Figure 2. Using a screwdriver, turn screw in a clockwise direction to tighten spring and re-adjust the counter-balance. This operation should only be done when necessary.

As is true of any mechanical product, proper lubrication insures smooth operation and decrease wear. Lubricate all moving parts of your Bridge periodically, using the special train lubricant, Lionel No. 925, prepared for this purpose. Motor bearings and gears are accessible by sliding the roof off the house. Carefully avoid gelling any grease on commutator and brushes of motor as this impairs the operation of the motor.

Should the beacon lamp on top of the bridge burn out, replace it with Lionel No. 7J7-54, 18 volts clear, stocked by your dealer.

DISCONNECT REVERSING UNIT IN LOCOMOTIVE

The built in unit which controls the reverse action of your 1ocomotive should be disconnected when operating a train in conjunction with No. 313 Bridge.

Disconnect unit as follows: When Locomotive is going forward, move the lever, which is located on the boiler top of most Lionel locomotives, to the oppo8ite position. Locomotive will then continue in the forward direction after being stopped.

Note: The graphic of Figure 1, is slightly different from the original although the connections are as they were in the original.

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LIONEL TRANSFORMERS

CONNECTIONS	APPROPRIATE BINDING POSTS ON TYPES					
	'B'	'T' or 'K'	'Q'	'R'	'V' or 'Z'	'W'
From Terminal No. 1 of Lockon	X	U	U	F	C	U
From Terminal No. 1 of Bridge	X	F	C	C	A	U
From Terminal No. 3 of Bascule Bridge	B	B	A	B	U	A

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Note: The graphic of Figure 1, is slightly different from the original although the connections are as they were in the original.

Repair Instructions for
Lionel 313 Bascule Bridge
by
Richard J. Luppold 87-24748

INTRODUCTION:

These instructions apply to Lionel's #313 Bascule Bridge which was manufactured from 1940 to 1942 and from 1946 to 1949. This bridge has the motor and gearbox in the bridge tender's shack and is probably the most common version. The 1947 version was modified to mount the mechanism in the tower by the motor. It has more reduction gears and places less strain on the motor.

DISASSEMBLY:

NOTE: Mark parts and make drawings before taking the bridge apart, especially the lever assemblies in the tower caps and the crank arm from the gearbox to tower.

When removing pieces held together by metal tabs, bend and twist the minimum amount necessary to remove the piece. Remove house over the motor and unsolder the bridge light wire from post #2. Disconnect tension spring from the base and unscrew the crank arm from the gearbox-motor shaft. Note (record) position of the crank arm for reassembly. Remove end screws from the main shaft which passes thru the bridge frame and the bearing caps (top of towers). Slide the shaft out from both sides (noting and recording the position of the lever assemblies in the tower caps) and the bridge frame will be free from the base. Remove the towers from the base by twisting the tabs under the base. The bottom frame of the tower on the motor side is cut away to facilitate removal of the tower without disconnecting the motor/gearbox drive shaft. The gearbox is a straight forward matter and can be cleaned and lubricated by removing the top cover. It can be removed, if necessary, by unscrewing it from the base. Keep track of the screw positions as they are of different lengths. Sketch the gear positions before removal.

The leaf switch, which is located under the eccentric on the motor/gearbox shaft, is a layered contact assembly with four contacts separated with fibre washers and fastened with a screw thru the base. These contacts are actuated by the eccentric on the gearbox shaft and are responsible for all the functions of the bridge operation. These contacts can be cleaned by TV tuner spray or equivalent. If it is necessary to remove the switch, keep it together with a screw and a nut.

ASSEMBLY:

NOTE: It is recommended that the tower/motor be assembled first and the operating mechanism tested without the bridge in place. This may seem redundant, but it is difficult to assemble the whole bridge and you only want to do it once.

Place the bearing caps in their respective positions. Temporarily fasten the towers to the base by slightly twisting one tab, with the larger holes in the bearing caps facing inward. Make sure that the lever assemblies are in the correct position and run the main shaft thru the towers. Remember the lever with the spring goes in the tower furthest from the motor. You can use a

drill bit, 1/8" drive pin, to keep the levers aligned in the bearing caps. Attach the spring to the base but do not tighten. Attach the crank arm to the eccentric on the gear shaft. The eccentric screw hole should be in the 90° position at this point. The ears on the shaft, which runs thru the bridge, should also be at 90°. Install the screws in the ends of the shaft. Apply 10 to 14 volts to posts #1 and #2. The shaft in the bridge towers should rotate approximately 60° counterclockwise and return to the 90° position with one full revolution of the gearbox eccentric. If a problem is encountered at this point, check either the lever assemblies and/or the crank arm. Correct the problem and retest. Tighten the tabs on the towers to the base.

Having tested the tower/motor assembly, attach the bridge to the frame. Loosen the spring from the base and disconnect the crank arm from the eccentric. Remove the screw from the shaft over the tower and slide the shaft thru until it is flush with the inside edge of the other tower. Use a drill bit, or drive pin, to keep the lever arm assembly aligned in the motor/tower bearing cap. The bridge can now be moved into position and the shaft slid thru. This will take some maneuvering as it is difficult to line the slots on the shaft to the lever assemblies with the bridge in position. Install the screw into the end of the shaft. Fasten the spring to the base and the crank arm to the eccentric (screw hole at 90°). The next step is to adjust the counterbalance spring, which is critical to the bridge operation. This adjustment is affected by several factors:

a.) The condition of the spring.
b.) Condition of the motor.
c.) Voltage. The recommended operating voltage is 10- 14v. This may have to increased slightly to either a.) and/or b.) and/or the transformer setting.

Initially tighten the spring until there is a notice- able separation in the spring coils. Use this as a starting point. Continue to tighten the spring by quarter turns of the screw until the motor strain seems minimal. These bridges can develop a bow in the base due to their 'H' design and excessive spring tension. Over tightening the spring, while aiding the motor operation, could lead to base warpage. It is recommended that if the bridge is not going to used for some period of time, that the spring be loosened to prevent it from taking a 'set' and requiring a readjustment for proper bridge operation.

ASSEMBLY of BRIDGE to FRAME (If taken apart for painting.)

Screw the side frames to the base, noting that the end of the base where the two sets of mounting holes are close together, goes to the motor base. Attach the wire braces first as these are difficult to crimp if the metal cross- braces are in place. There are five sets of wire braces, four long and one short. The short set spans the second opening from the front of the bridge frame.

ADDENDUM (Ron Morris 70-3178)

Spring tension and motor strain can be reduced by making the following modification:

Remove the top cover from the dummy counterweight. Place several ounces of lead shot and/or fish line weights in the counterweight bin. Readjust the spring tension for the least motor strain. If necessary, either add or subtract lead weights until the spring tension is minimal and proper bridge operation is obtained. Reinstall the counterweight cover.

ACCESSORIES

Part Number	Description	Price
	313 Bascule Bridge	
313-12	Cross Brace Assembly	
R-92	Lamp Socket	
R-91	Spring	
313-14	Lamp Lead Assembly	
1456-300	18 Volt Clear Lamp	
R-68	Red Jeweled Cap	
313-16	Wire Brace (Short)	
313-17	Wire Brace (Long)	
313-18	Deck Assembly	
313-20	Long Rail	
OC-18	Rail Pin (doz.)	
4/40 x 1/4"	R.H. Groove Screw Type "S"	
4/36 x 3/l6"	WHI Screw	
313-135	Gear Box Complete	
313-130	Gear Box	
313-134	Gear Box Cap Painted	
313-91	Second Intermediate Shaft Assembly	
50M-2	Drive Shaft Worm	
313-65	Crank Shaft Assembly	
00lE-144	Worm Bearing	
313-21	Pivot Shaft	
313-107	Flex. Coupling Shaft Assy.	
313-94	First Intermediate Shaft Assembly	
56-15	Lockwasher	
40 x 9/16"	Rec. Fil. Hd. Screw	
313-58	Upper Spring Assembly	
313-61	Short Contact Spring Assy.	
167-21	Spacer Washer	
RCS-26	Spacer Washer	
313-60	Lower Spring Assembly	
RCS-27	Spacer Button	
313-57	Contact Spring	
4/40 x 9/16"	RHI Screw	
RU-35	Spring Washer	
313-143	Flexible Coupling Spring	
4/40 x 9/32"	RHI Screw	
4/40 x 1/2"	RHI Screw	

Part Number	Description	Price
313-41	Bearing Cap	
313-23	Lever Arm Assembly L.H.	
313-26	Lever Arm Assembly R.H.	
313-28	Crank Arm Assembly	
6/4 x 1/4"	Rc.. Fi1. HI Screw	
313-31	Crank Arm Screw	
313-42	Connecting Rod	
313-32	R.H. Tower	
313-37	L.H. Tower	
313-45	Base	
4/40 x l/4"	RH Groove Screw Type "S"	
313-51	Short Rail	
313-47	Rail Spring Contact	
313-48	Insulating Piece	
313-52	Rail Insulation	
313-53	Spring Track Pin	
313-54	Terminal Plate Assembly	
153-4	Binding Poet	
313-81	Spacer Screw ("0" Gauge)	
88-2	Small Binding Post Nut	
313-77	Counter Balance Spring	
313-78	Spring Nut	
10/24 x 3"	Fil. HI Screw	
3l3M-l	Motor Complete	
313M-6	Rubber Bushing	
313M-7	Washer	
6/40 x 5/8"	Rec. RHI Screw	
313-62	House Body	
313-79	Roof	
313M-8	6/40 Hex Nut	
313-82	"O27" Track Pin - Fibre	
011-11	Fibre Pin ("O" Gauge)	
313-83	Special Track Section	
96C-l	Control Switch Complete	
l681E-19	Armature Bushing	
3l3M-10	Armature Complete	
313M-13	Brush Plate Complete	
1661E-29	Brush (pair)	
224E-101	Brush Spring (pair)	
4/36 x 3/16"	RHI Screw	

Note: The information contained on this parts list came from a list dated 9-54. The prices were deleted because many of them were not legible. Those that were legible were of the era.

INSTRUCTIONS for OPERATING
LIONEL No. 313
ELECTRIC BASCULE BRIDGE

FOR "O" GAUGE, "O-27" and "O-72" TUBULAR TRACK ONLY

When using Lionel "O-27" Track the four Spacer Screws which are assembled to the underside of the Bridge at "A" in Figure 1 must be removed. This makes the track level of the Bridge correspond to the rail height of "O.27" Track. If necessary, use a pair of pliers to start screws. Leave screws in for "O" Gauge and "O-72" Track.

HOW TO ASSEMBLE THE TRACK ANCHOR FRAME

The Anchor Frame provides correct alignment of the bridge track and the track in the layout.

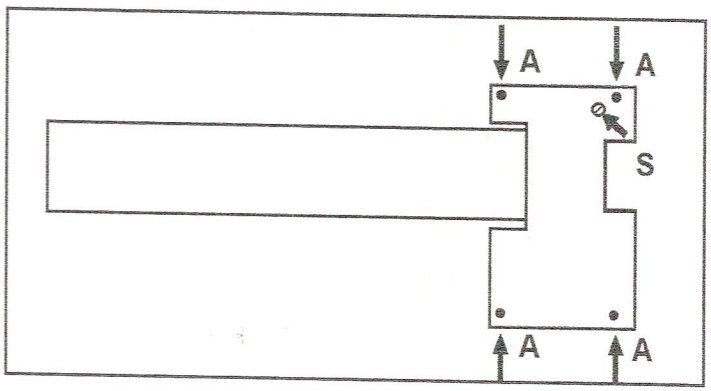

Figure 1

Slide the frame under the Bridge and place the two projecting pins underneath the base in the holes in the Track Anchor Frame. When the lever of the Special Lockon is closed, the adjacent sections of track will then be accurately lined-up with the rails on the Bridge. The position of the Track Anchor Frame when correctly assembled is shown in figure 2.

TWO INSULATED TRACK BLOCKS REQUIRED

Note that two insulated blocks of track are used, one at each approach to the Bridge. The purpose of these insulated areas is to stop a train from either direction when the Bridge is up. An insulated block should be composed of at least four sections of track. (These do not necessarily have to be straight sections.)

To make an insulated block of track, remove the steel pin from the center rail of the track section at the point where the insulated area begins. Substitute a fibre pin here. Two sizes of fibre pins "O" Gauge and "O-27", are supplied in the envelopes. Use the size appropriate for the pin hole in your track. When the track has been entirely assembled, and the two insulated blocks made, you are ready to make the connections shown in Figure 2.

HOW TO CONNECT THE BRIDGE

Place Bridge in track layout and make all wire connections shown in Figure 2. Proceed in the following steps:

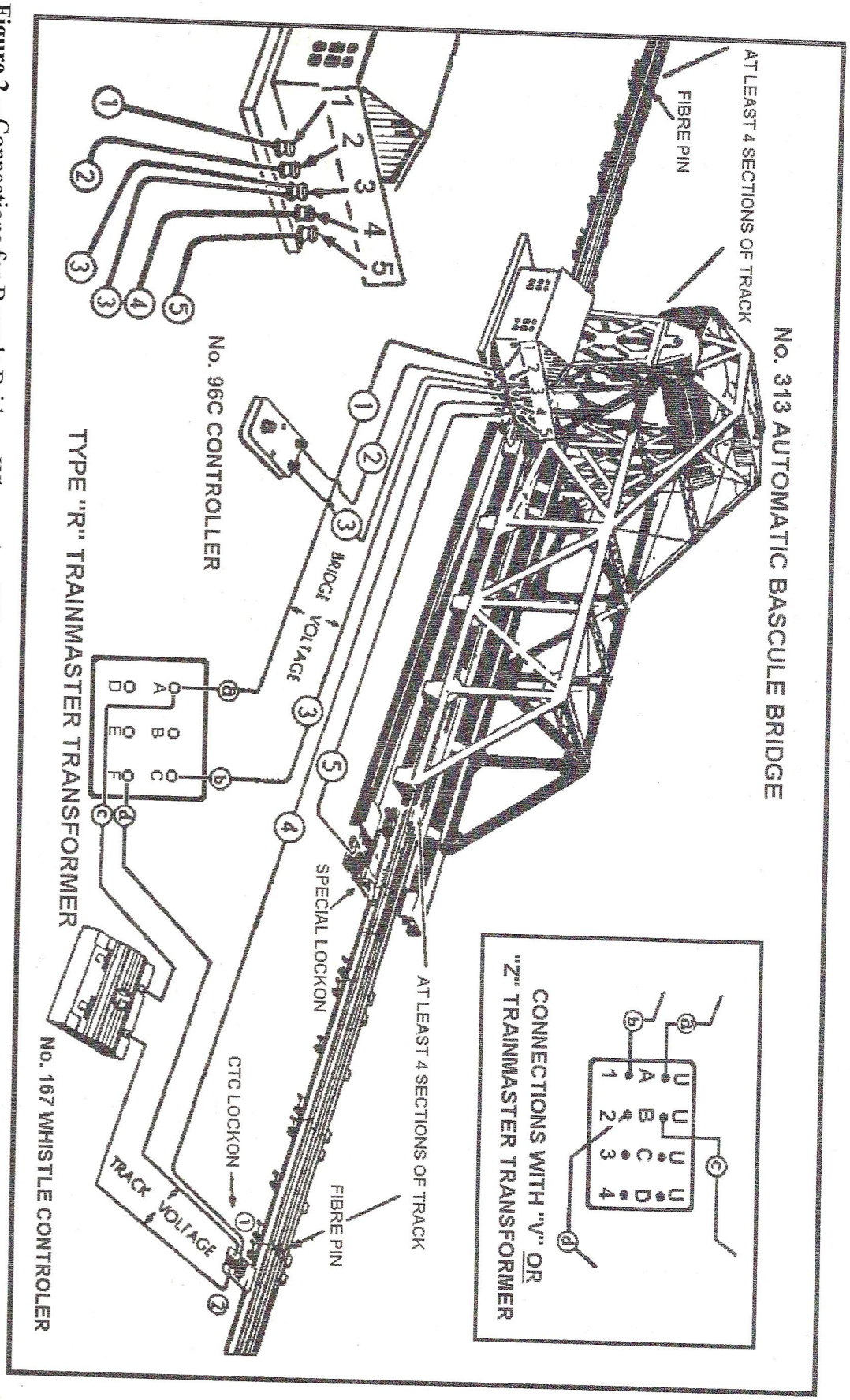

Figure 2 – Connections for Bascule Bridge. When using "V" or "Z" transformer, make connections as shown in insert.

1. Connect a wire from either binding post on No. 96C Controller to No.2 terminal on the Bridge.
2. Connect a wire from the other terminal of No. 96C Controller to No.3 terminal on the Bridge.
3. Connect a wire from No.4 terminal on the Bridge to No.1' terminal of the UTC Lockon.
4. Connect a wire from No.5 terminal on the Bridge to terminal of special of Special Lockon.

IMPORTANT – READ CAREFULLY

The above four connections apply in all cases, but the remaining four connections indicated as (a), (b), (c) and (d) in Figure 2, vary according to the size of your train outfit and the type of Lionel Transformer used.

Figure 2 shows the connections for a Type "R" Trainmaster Transformer, but the transformer table lists the proper binding posts to use for the various other types of Lionel Transformers. The letters (a), (b), (c) and (d) in the table refer to the correspondingly lettered wire connections in the diagram. It is possible by the use of this table to obtain the most desirable binding post combinations for all the principal types of transformers.

Note that (c) connection in the table offers a choice of three binding posts for each transformer. *Select only one* according to whether you desire high, medium or low voltage range which roughly corresponds to a large, medium or small train outfit.

This Bridge operates satisfactorily on approximately 14 volts and the (a) and (b) binding post connections give the nearest obtainable to 14 volts. When using Trainmaster Transformers having more than one control knob, the connection given in the table utilize one knob for controlling the voltage to the Bridge, while the second knob controls the operation of the train. In this case, the pointer of the first knob should be set at approximately 14 volt.

LIONEL TRANSFORMERS

CONNECTIONS			APPROPRIATE BINDING POSTS ON TYPES					
			'B'	'T' or 'K'	'Q'	'R'	'V' or 'Z'	'W'
BRIDGE	(a)		B	B	A	B	A	A
BRIDGE	(b)		X	F	C	C	U	X
TRACK	(c)	HIGH	A	A	A	A	B	A
TRACK	(c)	MED	B	B	B	B		B
TRACK	(c)	LOW	C	C	-	-		C
TRACK	(d)		X	U	U	F	U	X

OPERATION

When the Bascule Bridge is properly connected, action is as follows. Assume that a train is operating on the track layout and is approaching the Bridge, either side. Press button on No. 96C Controller before train reaches the insulated area. Hold button down only until Bridge starts to rise. Then release button and consequent operation of the Bridge and train will be automatic. Bridge will start to rise, train reaches entrance to bridge and stops because of the dead section. Bridge rises to maximum height then lowers and after the track level is normal again the waiting train starts up automatically. Motor in Bridge will then stop. To repeat cycle of operation, button on No. 96C Controller must be pressed again at the proper time. **CAUTION**–Do not operate Bridge at excessive speed as it causes cycle of

operation to repeat itself automatically.

This Bridge can be used on an even floor level without the need of grade approaches--or it can be used actually to span a gulf or chasm in the model railroad terrain.

MAKING THE TRACK LAYOUT

A section of "O27" straight track of *special length* is provided with each Bascule Bridge. Use this when constructing an "O-27" layout to balance the opposite side tor the oval from the Bridge, otherwise the regular sections of standard length will not fit together to make a complete circle. (Special section not required with "O" Gauge.)

Layouts using "O-72" Track will require one section of OS Straight Track on the same side of the layout as the Bridge.

SPECIAL INSTRUCTIONS

This Bridge is carefully balanced by an extension spring in order to lessen the load on the motor and improve the opening and closing operation. If, after a period of time, this spring should "set" in such a position as to affect the counter-balancing, and the motor requires excess voltage, the spring should be tightened to decrease the load on the motor.

The large slotted-head screw which controls the spring tension is indicated as "S" in Figure 1. Using a screw driver, turn screw in a clockwise direction to tighten spring and readjust the counter-balance. This operation should only be done when necessary.

As is true of any mechanical product, proper lubrication insures smooth operation and decreases wear. Lubricate all moving parts of your Bridge periodically, using the special train lubricant, Lionel No. 925, prepared for this purpose. Motor bearings and gears are accessible by sliding the roof off the house. Carefully avoid getting any grease on commutator and brushes of motor as this impairs the operation of the motor.

Should the beacon lamp on top of the Bridge burn out, replace it with Lionel No. 717-54, 18 volts clear, stocked by your dealer.

DISCONNECT REVERSING UNIT IN LOCOMOTIVE

The built-in unit which controls the reverse action of your locomotive should , be disconnected when operating a train in conjunction with No. 313 Bridge.

Disconnect unit as follows: When locomotive is going forward, move the lever, which is located on the boiler top of most Lionel Locomotives, to the opposite position. Locomotive will then continue in the forward direction after being stopped.

SERVICE INFORMATION

This article was inspected at the Factory and is in perfect operating condition.

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No. 313 BASCULE BRIDGE

When using "O-27" Track the four Spacer Screws which are assembled to the underside of the Bridge at "A" In Figure 1 must be removed. This makes the track level of the Bridge correspond to the rail height of "O-27" Track. If necessary, use a pair of pliers to start screws.

TWO INSULATED BLOCKS REQUIRED

Note that two insulated blocks are used, one at each approach to the Bridie. The purpose of these insulated areas is to stop a train from either direction when the Bridge is up. An insulated block should be composed of at least four sections of track.

When the track has been entirely assembled and the two insulated blocks made, you are ready to make the connections shown in Figure 2.

HOW TO ASSEMBLE THE TRACK ANCHOR FRAME

The Anchor Frame provides correct alignment or the Bridge track and the track in the layout.

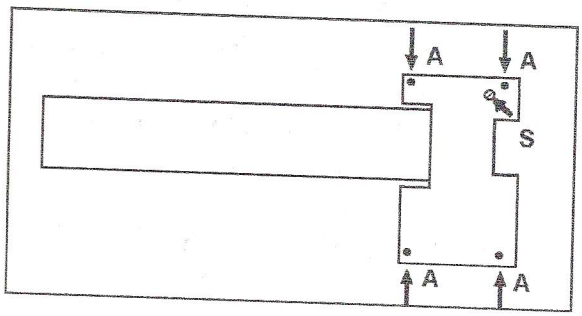

Figure 1

Slide the frame under the Bridge and place the two projecting pins in the holes in the Track Anchor Frame. When the lever on the Special Lockon is closed, the adjacent section of track will then be accurately lined up with the rail on the Bridge. The position of the Track Anchor Frame when correctly assembled as shown in the illustration in Figure 2 below.

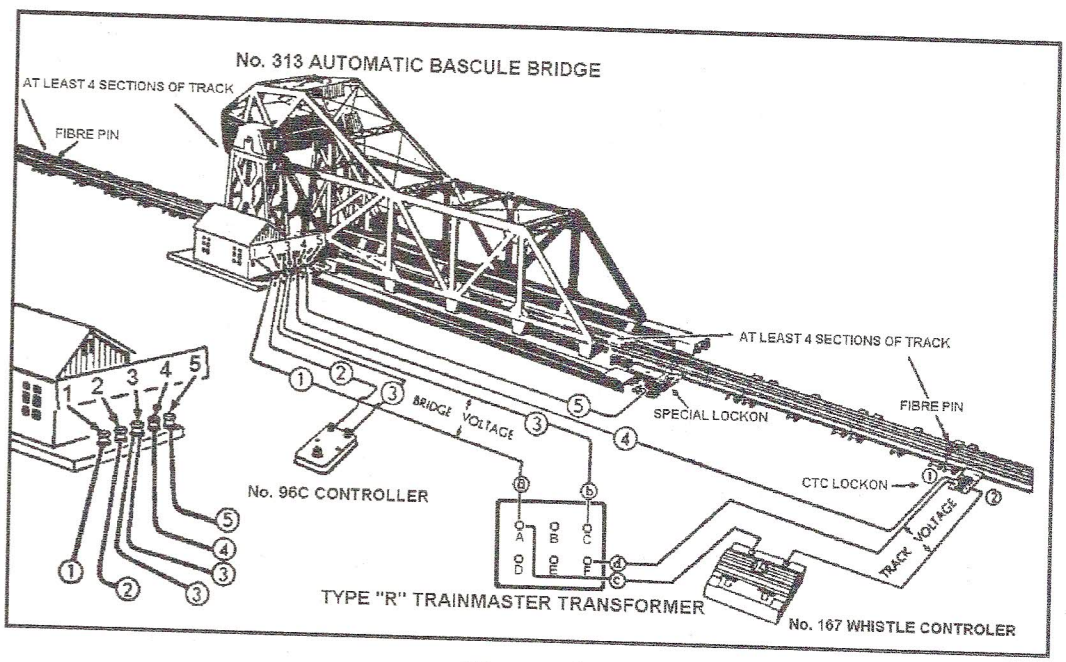

Figure 2

HOW TO CONNECT THE BRIDGE

Place Bridge in track layout and make all wire connection shown in Figure 2. Proceed In the following steps.

1. Connect. wire from either binding post on No. 96C Controller to No. Z terminal on the Bridge.
2. Connect wire from other terminal of No. 96C Controller to No. 3 terminal of the Bridge.
3. Connect a wire from No.4 terminal on the Bridge to No. 1 terminal of the UTC Lockon.
4. Connect a wire from No.5 terminal on the Bridge to terminal on Special Lockon.

The above four connection apply in all cases, but the remaining four connection indicated as (a), (b), (c) and (d) in Figure 2, vary according to the size of your train outfit and the type of Lionel transformer used.

Figure 2 shows the connections for a type "R" transformer, but the transformer table below lists the proper binding posts to use for various other types.

Note that (c) connection in the

LIONEL TRANSFORMERS								
CONNECTIONS			APPROPRIATE BINDING POSTS ON TYPES					
			'B'	'T' or 'K'	'Q'	'R'	'V' or 'Z'	'W'
BRIDGE	(a)		B	B	A	B	A	A
	(b)		X	F	C	C	U	X
TRACK	(c)	HIGH	A	A	A	A	B	A
		MED	B	B	B	B		B
		LOW	C	C	-	-		C
	(d)		X	U	U	F	U	X

NOTE: The transformer table lists transformers by only a single letter code, but later model transformers which are named with two letters (Ie: ZW, TW, etc.) can be included by simply dropping the second letter W.

transformer table offers a choice of three binding posts for each transformer. Select only one according to whether you desire high, medium, or low voltage range which roughly corresponds to a large, medium, or small train layout.

The Bascule Bridge operates on approximately 14 volts and the (a) and (b) binding post connections give the nearest obtainable to 14 volts. When using *TRAINmaster* Transformers having more than one control knob, the connections given in the table utilize one knob for controlling the voltage to the Bridge, while the second knob controls the operation of the train. In this case, the pointer of the first knob should be set at 14 Volts..

OPERATION of THE BRIDGE

When the No. 313 Bascule Bridge is properly connected, action is as follows. Assume that a train is operating on the track layout and is approaching the Bridge, either side. Press button on No. 96C Controller before train reaches the insulated area. Hold button down only until Bridge starts to rise. Then release button and consequent operation of the Bridge and train will be automatic. Bridge will start to rises, train reaches the entrance to the Bridge and stop because of the dead section. Bridge rises to maximum height, then lower, and after the track level is normal again the waiting train starts up automatically. Motor in Bridge will then stop. To repeat cycle of operation, button on No. 96C Controller must be pressed again at the proper time.
CAUTION -- Do not operate Bridge at excessive speed as it causes cycle of operation to repeat itself automatically.

The Bridge can be used on an even floor level without the need of grade approaches – or it can be used actually to span a gulf or chasm in the model railroad.

SPECIAL INSTRUCTIONS FOR BASCULE BRIDGE

This bridge is carefully balanced by

an extension spring in order to less the load on the motor and improve the opening and closing operation. If, after a period of time, this spring should "set" in such a position as to affect the counter-balancing, and the motor requires excess voltage, the spring should be tightened to decrease the load on the motor.

The large slotted-head screw which controls the spring tension is indicated as "B" in Figure 1. Using a screwdriver, turn screw in a clockwise direction to tighten spring and re-adjust the counter balance. This operation should only be done when necessary.

As is true of any mechanical product, proper lubrication insures smooth operation and decreases wear. Lubricate all moving parts of Bridge periodically. Motor bearings and gears are accessible by sliding the roof off the house. Carefully avoid getting any grease on commutator and brushes of motor, as this impairs the operation of the motor.

Should the beacon lamp on top of the Bridge need to be replaced, use Lionel No. 717-54, 18 volts.

DISCONNECT REVERSING UNIT IN LOCOMOTIVE

The built-in reversing E-unit in your locomotive should be disconnected when operating a train in conjunction with No. 313 Bridge.

Disconnect unit as follows: When locomotive is going forward, move the lever on the E-unit to the opposite position. Locomotive will then continue in the forward direction after being stopped.

Patented Jan. 9, 1945

2,366,848

UNITED STATES PATENT OFFICE

2,366,848

TOY TRACK LAYOUT

Henry J. Ferri, Fort Richmond, Staten Island, N. Y., assignor to The Lionel Corporation, New York, N. Y., a corporation of New York

Application May 7, 1941, Serial No. 392,283

16 Claims. (Cl. 104—149)

The present invention relates to toy track layouts, and is more particularly directed toward toy track layouts having an accessory forming part of the track system and adapted to be moved into and out of position with respect to the fixed part of the track system.

The present invention contemplates a toy track layout having a piece of movable equipment such as a bridge interposed in the layout and provided with means for moving the bridge into and out of normal position.

According to the present invention train operation may be carried on as usual when the bridge is in its normal position and means is provided whereby when the bridge is to be moved out of normal position the supply of current to the train is cut off at a distance sufficiently remote to permit the train to coast to a stop before it reaches the bridge, and means is also provided so that when the bridge is restored to normal position train operation is automatically reestablished.

Other and further objects will hereinafter appear as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, one of the many embodiments in which the invention may take form, together with modifications of certain parts, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is a diagram illustrating a toy track layout including a bridge;

Figure 2 is a perspective view of a track layout with bascule bridge in closed position and showing the external wiring;

Figure 3 is a wiring diagram;

Figure 4 is a perspective view of the bridge showing it open;

Figure 5 is a fragmentary side elevational view with parts in section on the line 5—5 of Figures 6 and 7;

Figure 6 is a transverse sectional view of the bridge;

Figure 7 is an inverted plan view of the fixed base for the bridge;

Figure 8 is an enlarged sectional view on the line 8—8 of Figure 6;

Figure 9 is a fragmentary view illustrating the outer end of an anchor frame used to secure track in position at the outer end of the bridge; and

Figures 10 and 11 are fragmentary views similar to Figures 6 and 8, respectively, showing a modified form of construction.

Figure 1 shows a simple track loop having a portion between the points 10, 10 around the lower part of the figure wherein the power and return rails are energized in the usual manner. This portion of the track layout may be in any form or configuration desired, and may include various forms of trackage over which the train is adapted to run.

The points 10, 10 are spaced ends of continuously energized track and between these two ends is a gap which is not continuously energized. This gap is narrowed at each end by several "dead" sections of toy railroad track provided for coasting the train to a stop. These sections are connected to the other track in the usual way, except that the power rail is insulated as indicated at 11, 11 of Figures 2 and 3. The end 12 of the length of coasting track to the left of the bridge is connected to the base 13 of the bridge. The deck of the bridge, designated generally by the reference character 14, extends over to the end 15 of the other coasting section. In the drawings three rail toy railroad track is shown, but this may be replaced, if desired, by two rail track wherein the rails are insulated.

When the bridge is lowered as in Figure 2, the trackage is continuous so that a train may be operated over it and the circuit control is such that this may be accomplished. When the bridge is raised as indicated in Figure 4, it is obvious that the trackage is interrupted so that the train cannot operate through the bridge. The bridge including base and deck is a complete article of manufacture adapted to be inserted into the toy track layout and will be described in detail later.

Referring to Figures 2 and 3 it will be seen that the power is taken from a transformer 20, preferably of the type having two or more separately controllable output voltages. Two wires 21 and 22 are taken from the terminals of the transformer 20 (usually marked "B" and "F"), the wire 22 being connected to the power rail 23 of the continuously energized track and the wire 21 being connected to the wheel bearing or return rails as indicated at 24.

When the bridge is lowered all the track is energized and train operation may be had as usual. The lead 22 supplying power to the third or power rail is connected by a wire 25 with a terminal binding post 26 insulatedly carried by the bridge base, and this binding post is connected to a wire 27, a contact 28, contact 29, wire 30 to

binding post 31. The binding post is connected by wires 32 with the third or power rail 33 carried by the bridge. The binding post 31 is also connected by a wire 34 with the power rail 35 of the coasting section at the right of Figures 2 and 3. The binding post 29 is connected by a wire 36 to a signal lamp 37 whose other contact is grounded to the structure.

The relatively fixed base or support for the bridge, designated generally by the reference character 13, includes a substantially flat die casting 40 and two sheet metal lattice towers or uprights 41 and 42 surmounted by molded caps 43. These caps support a rod or shaft 44 to which the bridge "deck," designated generally by the reference character 14, is secured.

The movable part, or deck, of the bridge may take various forms and configurations depending upon the ornamental appearance and style desired. It is here shown as made up to simulate a bascule bridge, and has two side stampings 45, suitable cross members at the top indicated at 46 and 47, a weight simulating portion 48 and a track carrier 49 preferably made of a piece of molded insulating material.

The casting 40 carries the short length of insulated power rail indicated at 33, two wheel bearing rails indicated at 50 and 50a. At the left end these three rails are provided with split pins similar to those usually found in toy railroad track, so as to fit the track sections to the left of the toy bridge as shown in Figures 2 and 3. As the track rail of this coasting section is grounded to the other return rails it is obvious that the base of the bridge is grounded so that a return is provided for the signal lamp 37. At the same time no current is fed from the power rail to the left of Figure 3 through the power rail 51 which is electrically connected with the rail 33 on the base of the bridge.

The base casting 40 supports a motor 52 which through reduction gearing 53 drives a shaft 54 at a low rate of speed. The housing and gearing are housed in a shanty-like structure 101. The shaft enters a gear box 55 formed in the casting 40 and carries a worm 56 adapted to drive a worm wheel 57 carried on a horizontal shaft 58. This shaft is placed above the contacts 28 and 29 above referred to.

One side of the motor 52 is connected by a wire 59 with a binding post 60 which in turn is connected to an external wire 61 with a transformer terminal, generally marked by the letter "C" on the transformer. The terminal marked "1" on the transformer is connected by a wire 62 to a binding post 63 carried on the base of the bridge. As indicated diagrammatically in Figure 3 different voltages may be impressed on the track and to the bridge motor and either circuit may be opened or closed without affecting the other.

The binding post 63 is connected by a wire 64 with a contact 65 spaced above and normally out of contact with a contact 66. The contact 66 is biased toward contact 65 above the contact 28 and is connected by a wire 68 with the binding post 69 and by a wire 69' with the other side of the motor 52. A motor starting switch 70 is connected by wires 71 and 72 with the binding posts 60 and 28, respectively.

When one desires to operate the bridge to raise it the switch 70 is closed and held closed for a moment. This will cause the motor 52 to operate the reduction gearing and turn the shaft 58. The shaft carries a rotatable member 73 having insulating pin 74 engageable with the contact 66 to open the circuit at the end of the cycle and two spaced pins 75 and 76 engageable with the contact 28. The pin 75 presses 28 against 29 momentarily and sends a pulse of current to the track circuit so as to operate the locomotive reversing switch one step. The pin 76 holds the track circuit closed until the bridge motor is again energized.

The rotatable member 73 is provided with a screw 80 which enters a slot 81 in the lower end of a connecting rod 82. The upper end of this rod is slotted as indicated at 83 and connected to a crank arm 84 carried by the shaft 44. The slots 81 and 83 in the connecting rod 82 make it possible for one to manually lift the bridge deck without injuring the mechanism. Such manual lifting will not affect any of the electrical switch connections. The other end of the shaft 44 carries a crank 85 connected with a counterbalancing spring 86.

When the parts are in the normal running position, as shown in Figures 2, 3, and 6, the contacts 28 and 29 are in closed position as above described and the contacts 65, 66 are open. The closing of the manual switch 70 starts the motor in operation and this brings about an opening of the track circuit between the contacts 28 and 29 and the closing of the motor running circuit between the contacts 65 and 66. On the opening of the track circuit the power rails of the coasting sections and the bridge are deenergized so that the locomotive of the train will no longer operate to propel the train and the train will coast to a stop as indicated at the right of Figure 4. The motor running switch will permit the motor to continue operation to raise the bridge and then lower it.

During operation of the bridge motor, pin 75 will cause the lost motion reversing switch to be advanced one step as set forth hereinabove. When the bridge is fully lowered contact 76 will open the bridge motor circuit, the bridge will come to rest and current will again be supplied to the track circuit through contacts 28 and 29, the reversing switch being advanced another step and the propulsion motor started again in the original direction.

Where the toy bridge is to be used on a level floor or other support the tracks of the coasting section to the right of the bridge will be secured to this floor in the usual manner, and the base of the bridge fixedly secured in place. Where it is desired to have the coasting section to the right of the bridge held in definite relation to the bridge structure itself, the device is provided with an anchor frame 87 which comprises two inverted channel shaped members 88 and 89, each having holes to receive lugs 89' formed in the casting 40, a cross strap 90 and a track clamping device indicated at 91. This device may include an insulating plate 92, a fixed metal plate 93 having the proper configuration to engage the third rail of the coasting portion of the track, and a swingable clamping member 94 to engage the wheel bearing rail. The fixed member 93 may be connected by a strap 95 with a clip 96 to facilitate securing the wire 34 in place and conducting current to the otherwise insulated power rail 33.

In order to insure good contact the rails 97, 98 and 99 on the bridge deck extend beyond the support 49 and engage springs and pins 100 and 100a secured to the rails 33, 50 and 50a, and the other ends of the rails on the deck are open so

as to pass down about the usual pins which project out of the left end of the coasting section to the right of the bridge.

Where the bridge is to be used with a non-reversible electric locomotive, or with a locomotive in which the reversing mechanism has been disconnected or disabled, the track cutout switch formed by the contacts 28' and 29' and the motor running switch formed by the contacts 85' and 86' may be under the control of a simple arm 102 carried on the shaft 88, as shown in Figures 10 and 11, and acting to close the track cutout switch contacts 28', 29' but once each cycle. The contacts 86' and 29' are secured together by an insulating spacer 103.

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 toy track layout comprising continuously energized track having spaced ends to form a gap and provided with a power rail and a return rail, a length of track forming a physical extension at one end of the energized track to narrow the gap and having the power rail thereof insulated from the power rail of the continuously energized track and the return rail thereof connected with the return rail of the continuously energized track, a second length of track forming a physical extension at the other end of the energized track to further narrow the gap and having a power rail insulated from the power rail of the continuously energized track and a return rail connected to the return rail thereof, a bridge base having power and return rails physically and electrically connected with the corresponding rails of one of the said lengths of track, a movable bridge deck having power and return rails aligned with the corresponding rails on the base and electrically connected with them when the deck is lowered, and a switch for interconnecting the energized power rail and the aligned power rails of said lengths of track, of the base and of the deck so that when the deck is lowered continuous train operation may be had through the layout.

2. A layout such as claimed in claim 1, having a motor for opening the switch to deenergize the power rails supplied thereby and for shifting the bridge deck to open and then to closed position after which it recloses the switch.

3. A layout such as claimed in claim 1, having a motor for opening the switch to deenergize the power rails supplied thereby and for shifting the bridge deck to open and then to closed position after which it recloses the switch, a manually closable motor starting switch, and a normally open motor running switch adapted to be closed by the motor and held closed until after the first switch is reclosed.

4. A layout such as claimed in claim 1, having a motor for opening the switch to deenergize the power rails supplied thereby and for shifting the bridge deck to open and then to closed position after which it momentarily closes the switch to send an impulse to the power rail, then opens it and recloses it.

5. A layout such as claimed in claim 1, having wired connections to both the power rail of the base and to the power rail adjacent the deck.

6. A layout such as claimed in claim 1, having a signal connected between the continuously energized power rail and the return rail of the base.

7. A toy track layout having a portion provided with continuously energized power and return rails and a portion in which the power rail is insulated from the corresponding rail of the first portion as well as the return rail and the return rail is connected to the return rail of the first portion and including a movable length of track and two fixed lengths of track on opposite sides of the movable length and over which the train may coast after its locomotive has passed from the first portion and been deprived of propulsion current, a normally closed track cutout switch extraneous of the rails, wiring connecting the power rail of the second portion to the track cutout switch and said switch to the source so that an electrically propelled train may operate over both portions of the layout, a motor, a manually operable motor starting switch, a normally open motor running switch, a motor operated rotor, and rotor operated means for closing the running switch after the motor has been started by the manual switch, for opening the track cutout switch to deenergize the power rail of the second section and discontinue train propulsion on the second portion of the track and for subsequently closing the track cutout switch to reenergize the same and for opening the motor running switch at the end of the cycle to restore the track layout circuits to normal.

8. A layout such as claimed in claim 7, wherein the movable length of track shifted from an aligned position to a disaligned position and returned to the aligned position by the motor during its cycle of operation.

9. As an article of manufacture, a toy bridge for a toy electric railroad, comprising a relatively fixed base having rails connectible at one side to the corresponding rails of the usual toy railroad trackage, fixed uprights carried by the base on opposite sides of the rails, a bridge deck extending from the other side of the base and secured to a shaft pivoted in the uprights to swing up and down and provided with rails aligned with the corresponding rails of the base and electrically connected to the same when the bridge deck is lowered, and a bridge deck lifting mechanism including a crank arm connected to the shaft, a motor operated shaft having a crank arm, and a connecting rod between the crank arms.

10. A bridge such as claimed in claim 9, wherein the rod is slotted so that the bridge deck may be manually raised.

11. A bridge such as claimed in claim 9, having a motor running and stopping switch under the control of the motor operated crank arm, and a manual switch for starting the motor.

12. A bridge such as claimed in claim 9, having a switch for controlling the circuit to the rails of the bridge and under the control of the motor operated crank arm to open the circuit when the bridge deck is raised and close it when the bridge deck is in the lowermost position.

13. A bridge such as claimed in claim 9, having a switch for controlling the circuit to the rails of the bridge and under the control of the motor operated crank arm to open the circuit when the bridge deck is raised and close it when the bridge deck is in the lowermost position, a manually controlled motor starting switch and a motor operated crank arm controlled running and stopping switch for the motor to stop it

Jan. 9, 1945. H. J. FERRI 2,366,848

TOY TRACK LAYOUT

Filed May 7, 1941 3 Sheets-Sheet 3

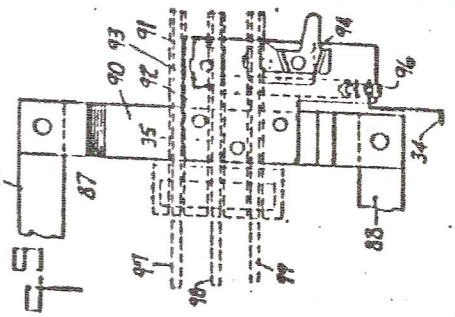

Fig. 5

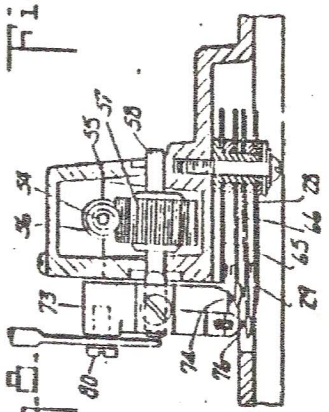

Fig. 8

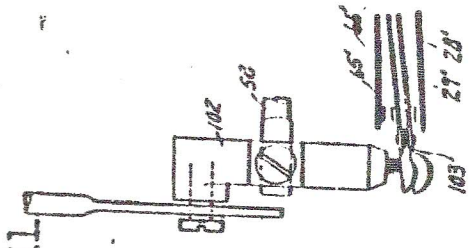

Fig. 11

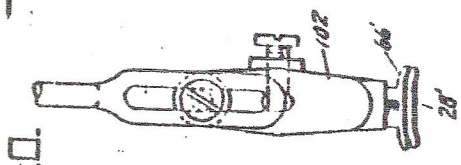

Fig. 10

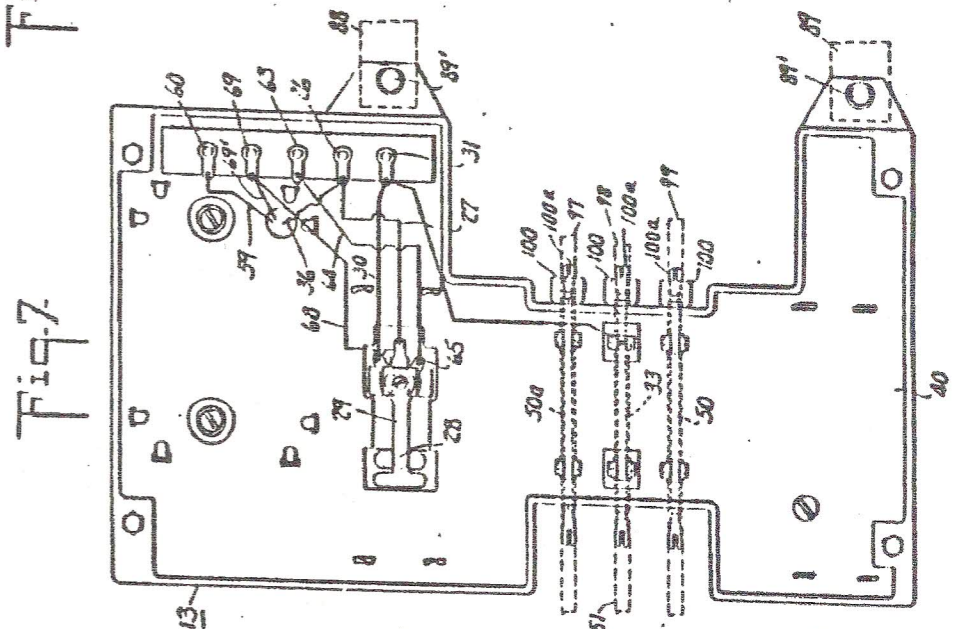

Fig. 7

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No.313 Electric Bascule Bridge
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TOY TRACK LAYOUT

Filed May 7, 1941 3 Sheets-Sheet 2

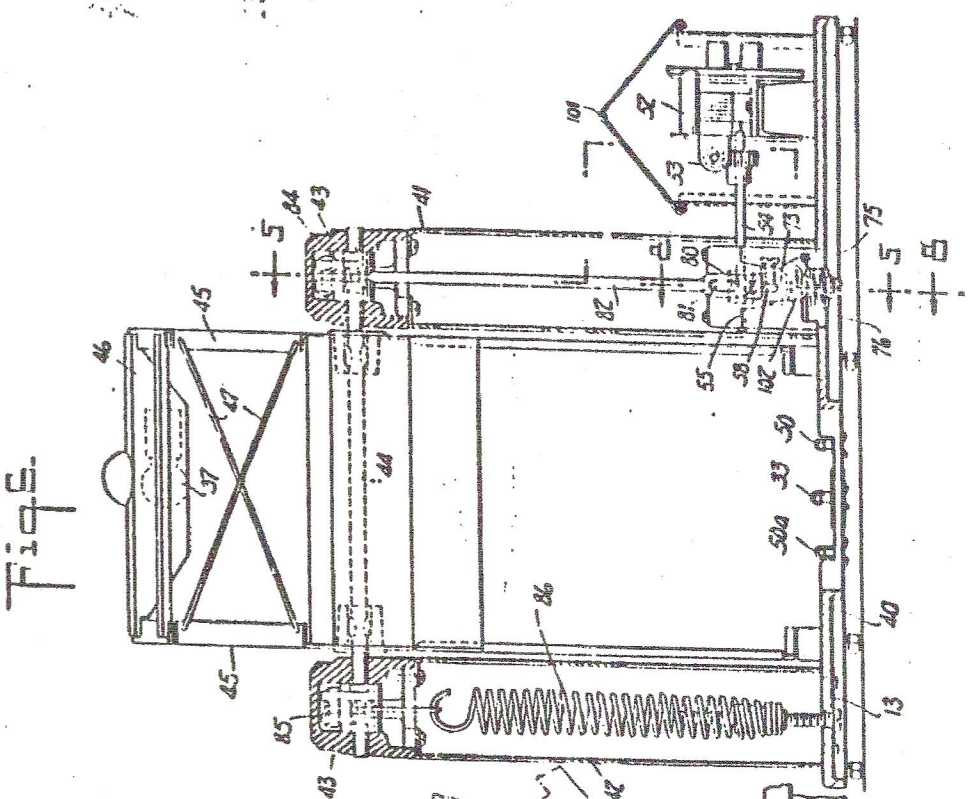

Fig. 5.

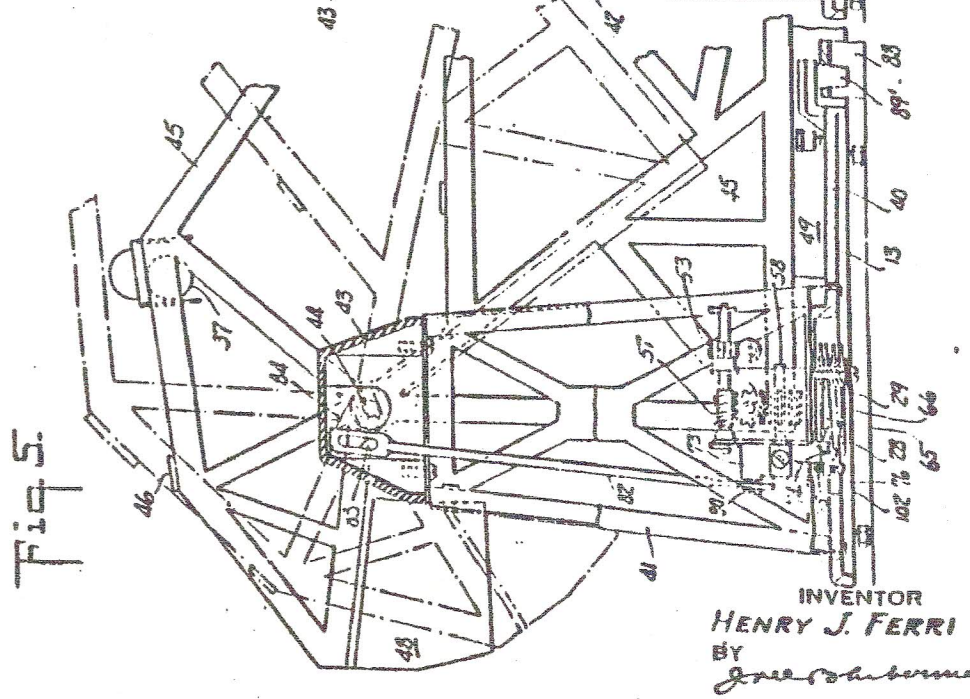

Fig. 5.

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