

# LIONEL SERVICE MANUAL

## LOCOMOTIVES NOS. 2330, 2340 and 2360

Locomotives Nos. 2330, 2340 and 2360 are all models of the Pennsylvania GG-1 electric locomotive and are identical mechanically and electrically, despite the difference in numbers. No. 2330 was made in 1950 only. Although externally similar to the previously manufactured No. 2332, this locomotive differed from the earlier version in several major respects, having two vertically mounted motors, magnetraction trucks and a battery-powered electric horn.

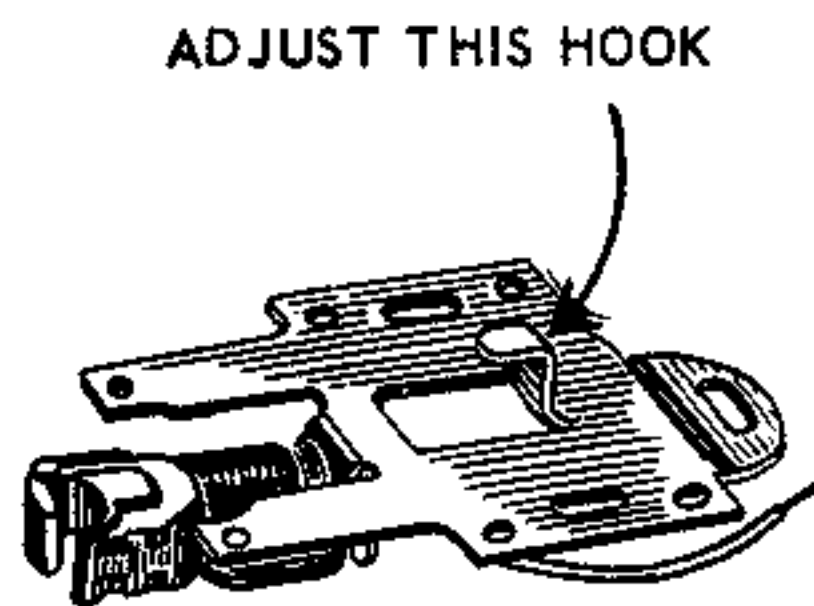
In 1955, when the manufacture of the GG-1 locomotive was resumed, its number was changed to 2340 with the expectation of several contemplated changes of design which, however, were not put in production. Another number change to 2360 was made in 1956 for the same reason but, again, the changes failed to materialize.

Both 2340 and 2360 locomotives were made in two colors: "-1" Tuscan red passenger locomotives and "-25" green general purpose engines.

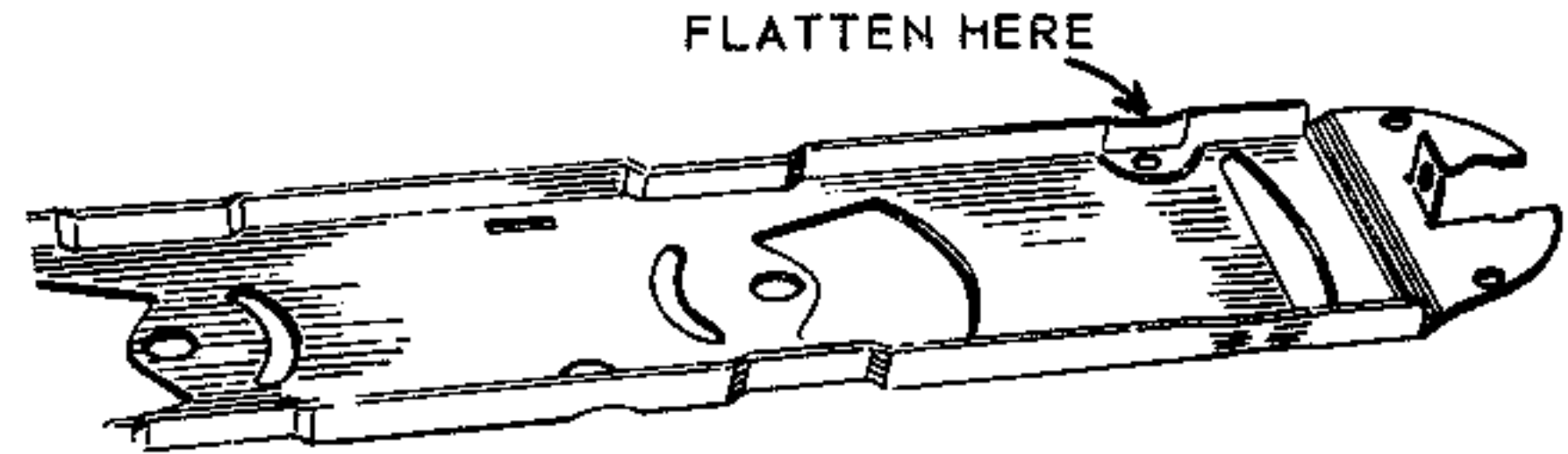
### SERVICE NOTES

Among service problems peculiar to these locomotives are the following:

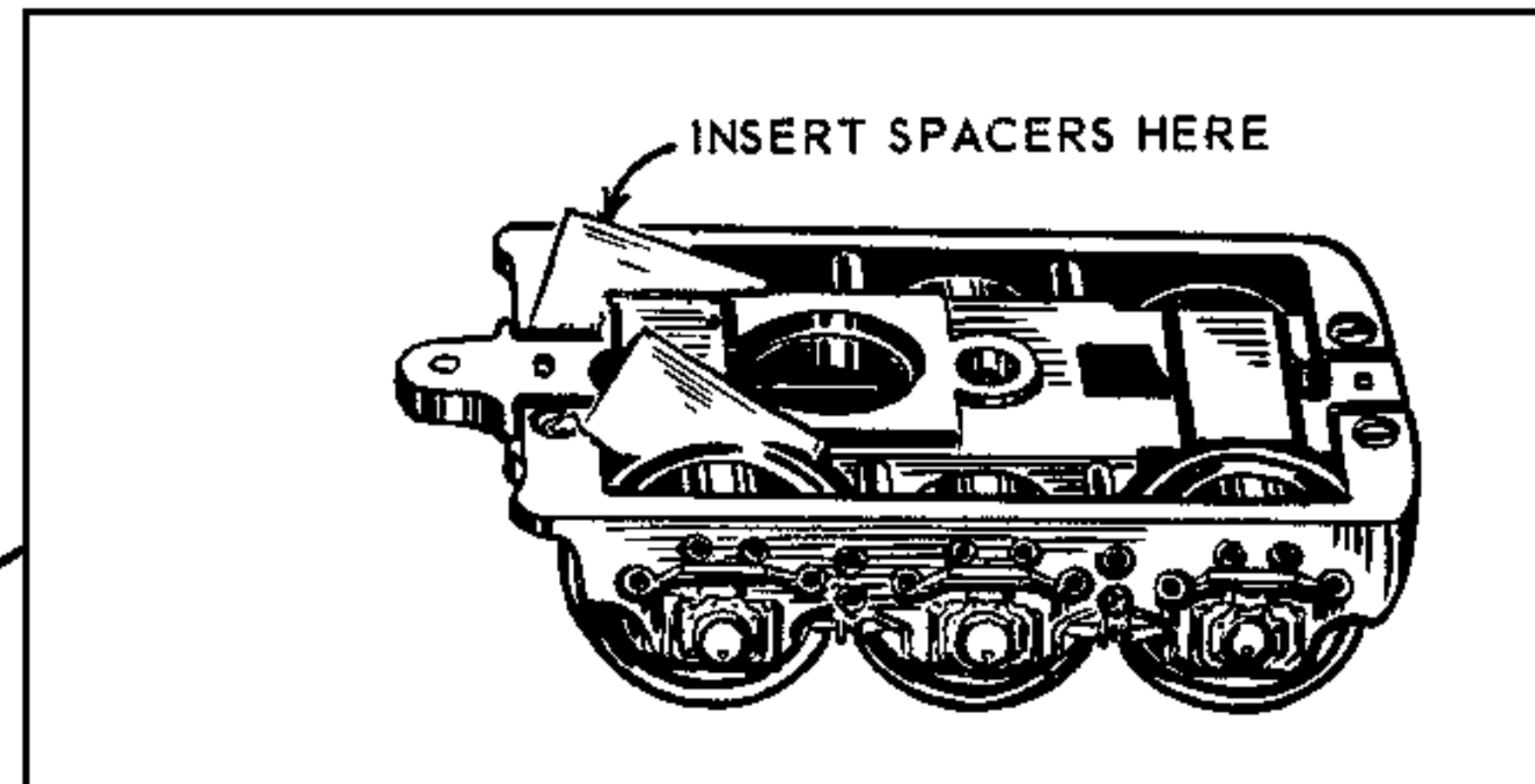
**Derailing of end trucks.** This may be caused by a distorted hook which holds the truck to the locomotive frame. Careful adjustment is required here to remedy the difficulty. As a matter of general practice sharp S-curves should be eliminated whenever possible.



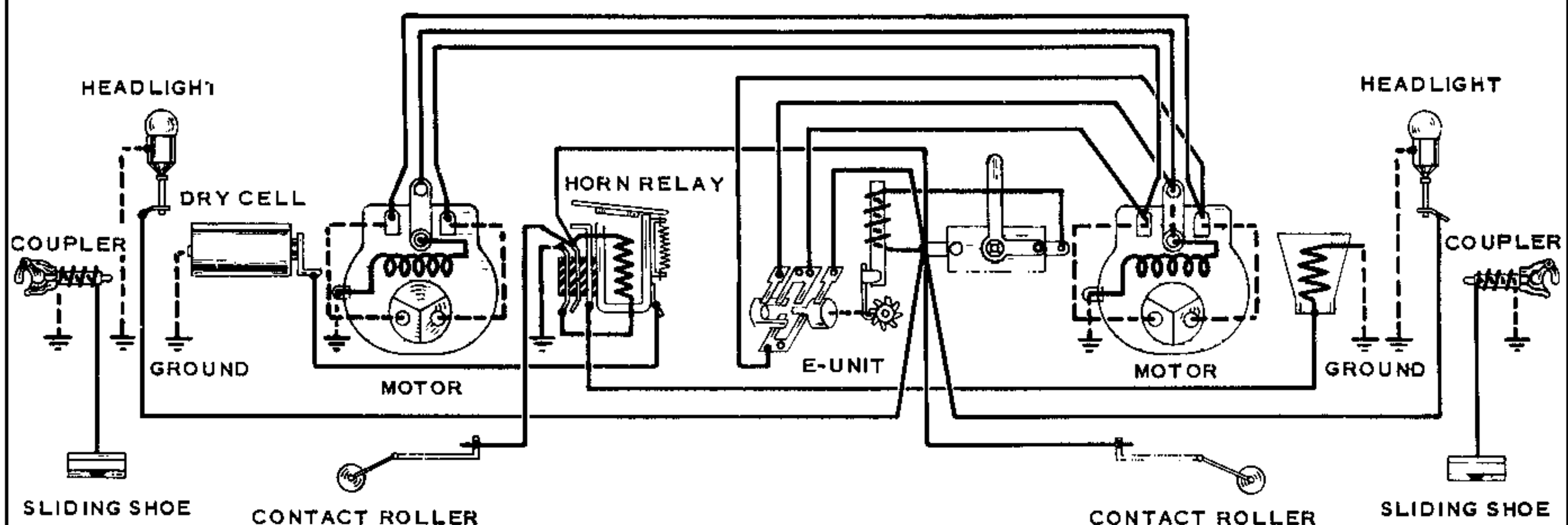
**Poor horn sound.** This is usually caused by the locomotive body pressing or touching the horn and can be checked by operating the horn with the body taken off. The remedy is to flatten the embossings on the locomotive frame in order to lower the horn. Spacer washers inserted between the locomotive body and locomotive frame under the mounting screws can also be used for the same purpose.



**Slipped magnet.** Occasionally one of the magnets cemented to the trucks will slip sideways and rub against one of the drive wheels acting as a very effective brake. The remedy is to remove the magnet, clean off the magnet and the magnet seat, and recement with Iron Glue letting it dry for 24 hours. Be sure to keep the magnet centered between the wheels by means of spacers until the glue dries thoroughly.

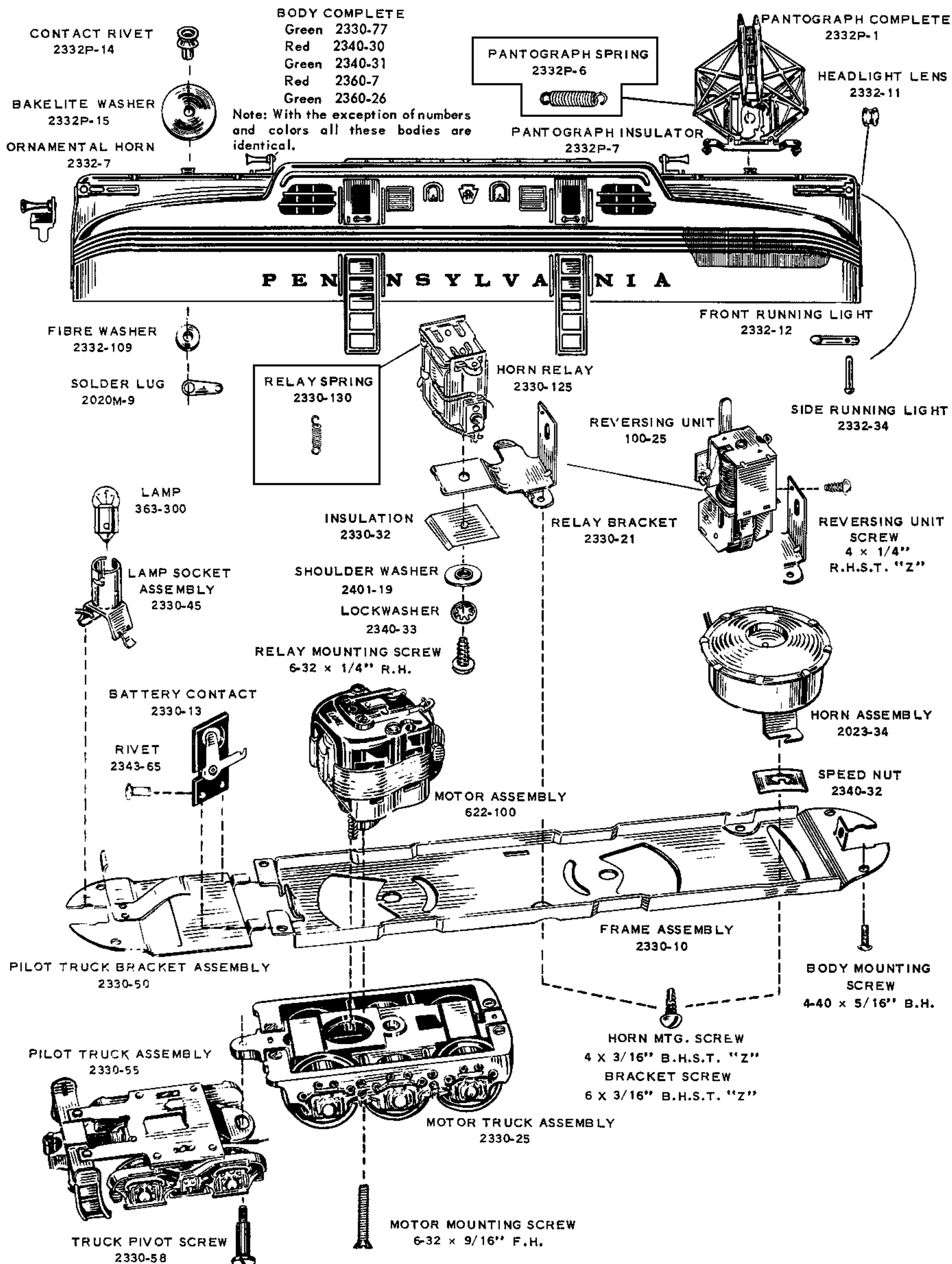


Schematic Wiring Diagram for Locomotives Nos. 2330, 2340 and 2360



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### REPLACEMENT PARTS FOR LOCOMOTIVES 2330, 2340 and 2360

Part No.	Name	List Price	Part No.	Name	List Price
6TC-10	Coupler and Coil Assembly	.60	2330-125	Horn Relay Complete	2.00
56-15	Lockwasher	.02	2330-130	Relay Spring	.10
100-25	Reversing Unit	2.75	2332-7	Ornamental Horn	.15
363-300	Lamp	.25	2332-10	Ladder	.12
480-16	Knuckle Spring	.02	2332-11	Headlight Lens	.05
622-100	Motor Assembly	6.50	2332-12	Front Running Light	.02
622-109	Armature	2.50	2332-34	Side Running Light	.02
622-114	Brushplate Asssmbly	.75	2332-35	R.H. Motor Truck Side	.35
622-121	Brush	Pr. .60	2332-36	L.H. Motor Truck Side	.35
622-181	Worm Wheel	.50	2332-76	Pilot	.50
622-184	Axle Bushing	.10	2332-78	Bottom Plate Assembly	.35
622-191	Brush Spring	Pr. .10	2332-109	Fiber Washer	.02
671-107	Collector Arm Rivet	.05	2332P-1	Pantograph Complete	3.00
671-108	Collector Spring	.02	2332P-6	Pantograph Spring	.05
671-112	Spacer	.02	2332P-7	Pantograph Insulator	.10
671M-22	Retaining Ring	.03	2332P-14	Contact Rivet	.10
671M-23	Thrust Washer	.02	2332P-15	Bakelite Washer	.05
681-16	Roller Pin	.02	2333-42	Insulation Washer	.05
681-121	Thrust Bearing	.15	2340-30	Body Complete (Red)	10.00
2020M-9	Solder Lug	.02	2340-31	Body Complete (Green)	10.00
2023-34	Horn Assembly	2.00	2340-32	Speed Nut	.05
2321-103	Rear Bearing	.10	2340-33	Lockwasher	.02
2330-3	Collector Sleeving	.05	2343-65	Rivet	.05
2330-10	Frame Assembly	1.50	2360-7	Body Complete (Red)	10.00
2330-13	Battery Contact	.25	2360-26	Body Complete (Green)	10.00
2330-16	Collector Arm Assembly	.40	2401-19	Shoulder Washer	.05
2330-18	Collector Roller	.10	TC-21	Coupler Knuckle	.10
2330-20	Collector Assembly	.75	TC-23	Knuckle Rivet	.02
2330-21	Relay Bracket		TC-70	Wheel	.05
2330-25	Motor Truck	5.00	TC-112	Plunger Spring	.02
2330-28	Axle	.20	TC-113	Plunger	.05
2330-29	Swaged Axle	.20	TC-118	Axle	.05
2330-30	Gear End Wheel & Axle	.60	3-48 x 3/16	F.H. Truck Side Screw	.02
2330-32	Insulation	.05	4 x 3/16	B.H.S.T. "Z" Horn Mtg. Screw	.02
2330-34	Gear Center Wheel & Axle	.60	4 x 1/4	R.H.S.T. "Z" Reversing Unit Screw	.02
2330-37	Gear End Wheel & Swaged Axle	.60	4-40 x 3/16	R.H. Brushplate Screw	.02
2330-38	Idler Gear	.10	4-40 x 5/16	B.H. Body Mtg. Screw	.02
2330-42	Collector Insulation	.05	4-40 x 3/8	R.H. Collector Mtg. Screw	.02
2330-45	Lamp Socket Assembly	.35	6 x 3/16	B.H.S.T. "Z" Bracket Screw	.02
2330-50	Pilot Truck & Bracket Assembly	.35	6-32 x 1/4	R.H. Relay Mtg. Screw	.02
2330-55	Pilot Truck Assembly	3.50	6-32 x 9/16	F.H. Motor Mtg. Screw	.02
2330-58	Truck Pivot Screw	.05			
2330-61	Center Wheel	.40			
2330-62	End Wheel	.40			
2330-77	Body Complete (Green)	10.00			

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## NOS. 2330, 2340 &amp; 2360 - LOCOMOTIVES - GG-1

Part Number	Location	Unit Price	Min. Quan.	Description
6TC-10	P-61	.75		Coupler & Coil Assem.
56-15	A-61	.02	25	#4 Lockwasher (Collector)
100-25	C-22	3.50		Reversing Unit
480-16	P-62	.02	50	Knuckle Spring
480-20	P-72	.02	50	Shoe Rivet
622-109	A-44	3.00		Armature
622-114	A-45	1.25		Brushplate
622-121	B-77	pr .60	6 pr	Brush
622-181		.75		Worm Wheel
622-184	B-75	.15	4	Axle Bushing (Motor Truck)
622-191	B-74	pr .10	6 pr	Brush Spring
671-107	C-72	.05	12	Collector Arm Rivet
671-108	C-72	.02	25	Collector Spring
671-112	C-57	.02	25	Spacer (Collector Insulating)
671M-22	C-75	.05	12	Retaining Ring
671M-23	C-75	.02	25	Thrust Washer
681-16	F-84	.02	25	Roller Pin
681-121	F-94	.25		Thrust Bearing
1445-300	LC	.30	10	Lamp
2020M-9	E-84	.02	25	Solder Lug (Body)
2023-34	L-34	2.50		Horn Assem.
2321-103	O-61	.15	4	Rear Bearing
2330-3	F-73	.05	12	Collector Sleaving
2330-10	L-13	2.00		Frame Assem.
2330-13	Q-78	.40		Battery Contact
2330-16	Q-64	.40		Collector Arm Assem.
2330-18	F-93	.20		Collector Roller
2330-20	Q-78	1.00		Collector Assem.
2330-21	Q-54	.20		Relay Bracket
2330-25	M-12	7.50		Motor Truck
2330-28	M-14	.20		Axle (Motor Truck)
2330-29	M-74	.20		Swaged Axle (Motor Truck)
2330-30	A-24	.60		Gear End Wheel W/Axle
2330-34	A-26	.60		Gear Center Wheel W/Axle
2330-37	L-27	.60		Gear End Wheel W/Swaged Axle
2330-38	Q-78	.15	4	Idler Gear
2330-42	F-73	.05	12	Collector Insulation
2330-45	F-67	.40		Lamp Socket Assem.
2330-50	M-13	.50		Pilot Truck & Bracket Assem.
2330-55	P-14	3.00		Pilot Truck Assem.
2330-58	Q-74	.05	12	Truck Pivot Screw
2330-61	M-31	.50		Center Wheel
2330-62	M-31	.50		End Wheel
2330-77	G-16	10.00		Body Complete (Green)

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Part Number	Location	Unit Price	Min. Quan.	Description
2330-100	Obsolete			Motor Complete
2330-125	F-83	3.00		Horn & Relay Complete
2330-130	F-73	.10		Relay Spring
2332-7	E-87	.20		Ornamental Horn
2332-10	E-87	.15	4	Ladder
2332-11	E-56	.10	6	Headlight Lens
2332-12	E-56	.05	12	Front Running Light
2332-34	E-66	.05	12	Side Running Light
2332-35	E-66	.50		Motor Truck Side RH
2332-36	E-66	.50		Motor Truck Side LH
2332-76	E-97	.50		Pilot
2332-78	E-97	.35		Bottom Plate Assem. (Truck)
2332-109	F-61	.02	25	Fibre Washer (Body)
2332P-1	F-71	2.50		Pantograph Complete
2332P-6	F-71	.05	12	Pantograph Spring
2332P-7	F-71	.10	6	Pantograph Insulation
2332P-14	F-71	.10	6	Contact Rivet (Pantograph Mtg.)
2332P-15	F-71	.05	12	Bakelite Washer (Body)
2333-42	F-52	.05	12	Insulation Washer (Collector)
2340-30	F-17	10.00		Body Complete (Green)
2340-31	F-17	10.00		Body Complete (Red)
2340-32	F-87	.05	12	Speednut (Horn Mtg.)
2340-33	F-87	.05	12	Lockwasher
2343-65	F-87	.05	12	Rivet (Battery Contact)
2360-7	E-11	10.00		Body Complete (Red)
2360-26	Obsolete			Body Complete (Green)
2401-19	L-91	.05	12	Shoulder Washer
TC-21	P-71	.15	4	Coupler Knuckle
TC-23	P-61	.02	25	Knuckle Rivet
TC-70	D-13	.10	6	Wheel (Pilot Truck)
TC-109	P-63	.02	25	Collector Shoe Plate
TC-112	P-63	.02	25	Plunger Spring
TC-113	P-73	.10	6	Coupler Plunger
TC-118	P-73	.05	12	Axle (Pilot Truck)
TT-208	P-93	.10	6	Shoe (Pilot Truck)
WS-69	G-62	.02	25	#6 Lockwasher (Relay)
3-48 x 3/16"		.02	25	FH Truck Side Screw
4 x 3/16"		.02	25	BHST "Z" Horn Mtg. Screw
4 x 1/4"		.02	25	RHST "Z" Reversing Unit Screw
4-40 x 3/16"		.02	25	RH Brushplate Screw
4-40 x 5/16"		.02	25	BH Body Mtg. Screw
4-40 x 3/8"		.02	25	RH Collector Mtg. Screw
6 x 3/16		.02	25	BHST "Z" Bracket Screw
6-32 x 1/4"		.02	25	RH Relay Mtg. Screw
6-32 x 9/16		.02	25	FH Motor Mtg. Screw

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### SERVICE NOTES

Among service problem peculiar to these locomotives, particularly when they are operated on Super-"0" trackage are the following:

*Derailing of End Trucks.* This may be due to

a. Excessive downward pressure of the uncoupling shoes causing the truck to lift up as it passes over switches and crossings. The recommended downward pressure should be no more than 35 grams. It is also advisable to replace the heavy coupler lead with flexible wire.

b. Excessive end play between the wheels and the frame of the pilot trucks. If wheel spacing is too wide one of the wheels may fail to follow the curve of a switch and derail the truck. A simple solution is to insert a horseshoe washer as a spacer between the wheels and the truck frame.

c. Distorted hook which holds the truck to the locomotive frame. Careful adjustment is required here to rectify the difficulty.

*Binding of the Power Trucks.* This may be caused by:

a. Rubbing of the magnet against one of the wheels. In this case pry out the magnet and recement it in correct position with Iron Glue, letting it dry for 24 hours. Keep the magnet centered between the wheels by means of spacers until the glue dries.

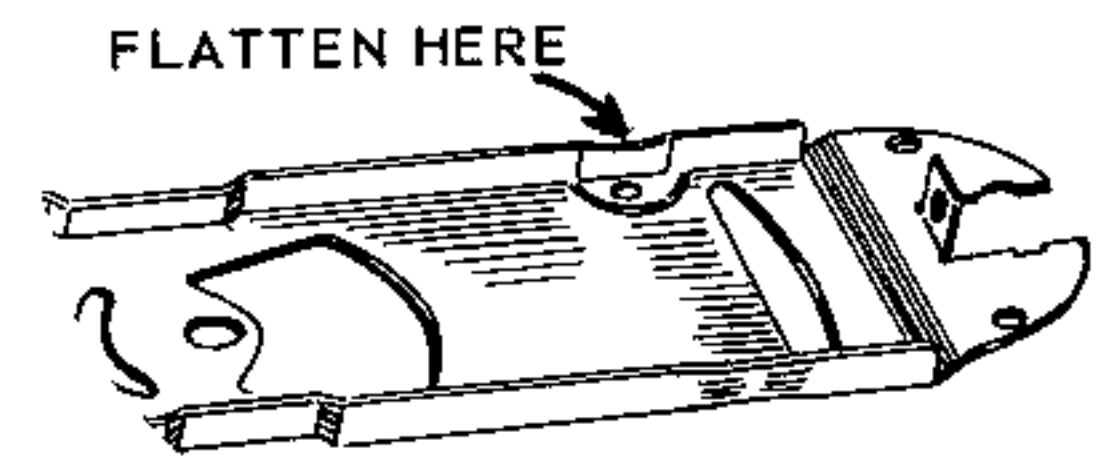
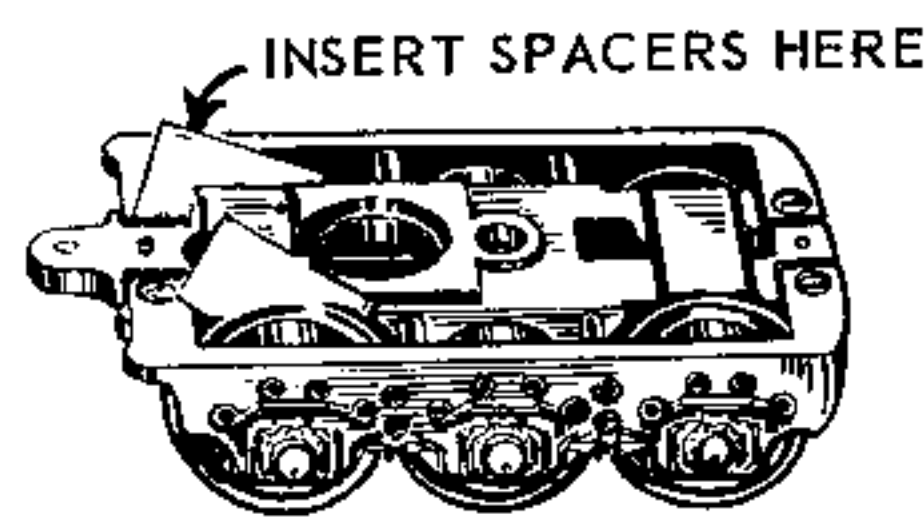
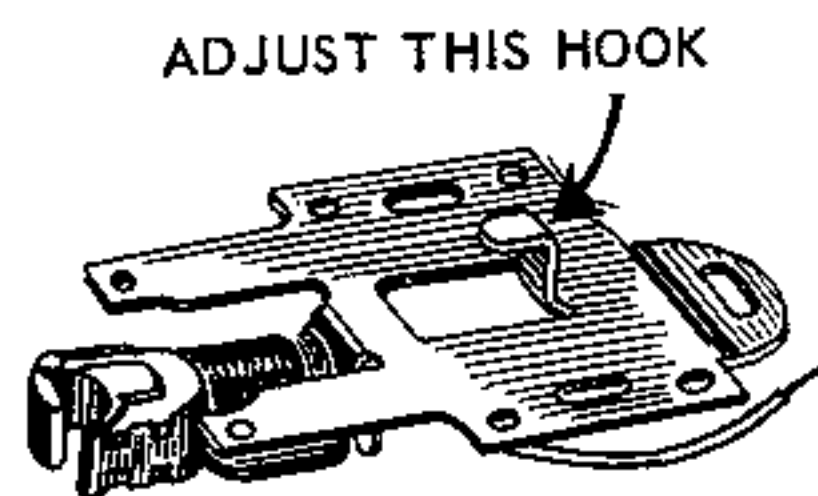
b. Rubbing of one of the wheels against the frame of the truck due by the bushing being driven too far into the truck frame. This is corrected by inserting a spacer washer between the wheel and the frame. To avoid removing the wheel cut out a section of No. 671M-19 washer slightly smaller than the diameter of the axle and push it over the axle.

*Power Trucks Derailing on Super-"0" Switches.* In some cases the locomotive entering on the swivel rail of the switch may force the swivel rail point away from the recess in the straight rail far enough for the following wheel to catch in the opening. The solution here is to adjust the swivel rail by bending the point slightly outward toward the recess and by filing down the lip of the swivel rail resting against the straight rail.

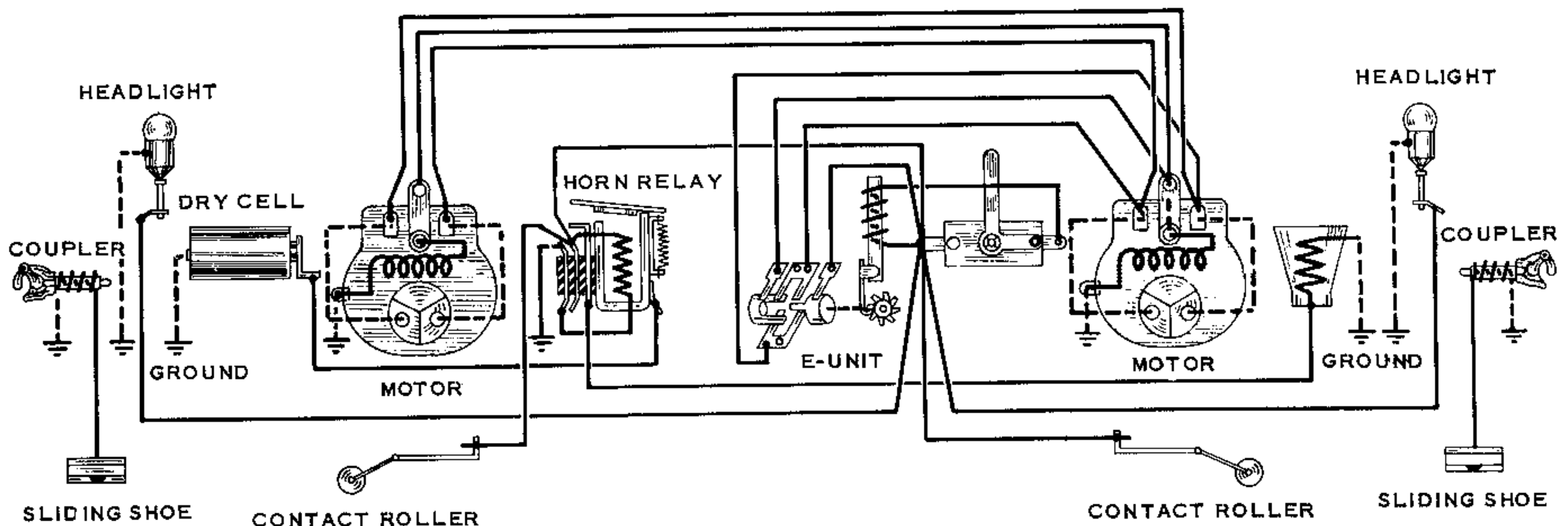
*Poor Horn Sound.* This may be caused by:

a. The locomotive body pressing or touching the horn. Check by operating the horn with the body off. The remedy is to flatten the embossings on the locomotive frame in order to lower the horn.

b. Inadequate or intermittent ground for the horn circuit. This can be corrected by bending out the lip of the frame to make better contact with the locomotive body.



Schematic Wiring Diagram for Locomotives Nos. 2330, 2340 and 2360



2340-1 Red Pennsy GG-1 Locomotive  
2340-25 Green Pennsy GG-1 Locomotive

<u>Part Number</u>	<u>Description</u>	<u>Price</u>	<u>Part Number</u>	<u>Description</u>	<u>Price</u>
<u>Body Assembly</u>			<u>Pilot Truck Assy.(Cont'd)</u>		
2340-31	Body Complete(Green)	10.00	TC-21	Coupler Knuckle	.10
2340-30	Body Complete(Red)	10.00	TC-22	Knuckle Spring	.02
2332-10	Ladder	.12	TC-23	Knuckle Rivet	.02
2332-7	Ornamental Horn Assen	.15	TC-113	Plunger	.05
2332-12	Running Light(Front)	.02	TC-112	Plunger Spring	.02
2332-34	Running Light(Side)	.02	TC-109	Shoe Plate	.02
2332P-14	Contact Rivet	.10	480-20	Shoe Rivet	.02
2020M-9	Solder Lug	.02	TT-208	Shoe	.05
2332P-15	Bakelite Washer	.05	TC-70	Wheel	.05
2332-109	Fibre Washer	.02	TC-118	Axle	.05
2340-8	End Decal	.05			
2332-122	Side Decal	.05			
2332-11	Head Light Lens	.05			
<u>Motor Truck Assembly</u>			<u>Motor Assembly</u>		
2330-25	Motor Truck Assen(Mag)	5.00	622-100	Motor Complete	6.50
2332-35	Motor Truck Side R.H.	.35	622-109	Armature	2.50
2332-36	Motor Truck Side L.H.	.35	622-114	Brush Plate Assen	.75
3/4x3/16	"F.H.I.Screw(Truck Side Sc)	.02	6/32x3/16	R.H.I.(Brushplate Sc.)	.02
2330-30	Gear End Wheel & Axle	.60	622-191	Brush Springs	Pr. .10
2330-37	Gear End Wh & Swaged Axle	.60	622-121	Brushes	Pr. .60
2330-61	Center Wheel(Plain)	.40	671M-22	Retaining Ring	.03
2330-34	Gear Cent. Wheel & Axle	.60	671M-23	Front Thrust Washer	.02
2330-62	End Wheel	.40	681-121	Thrust Bearing	.15
622-181	Worm Wheel	.50	6/32x9/16	F.H.I.(Motor Mtg Screw)	.02
622-184	Axle Bushing	.10			
2330-28	Axle	.20			
2330-29	Swaged Axle	.20			
2330-38	Pinion	.10			
2330-20	Collector Assen	.75			
2330-18	Collector Roller	.10			
681-16	Roller Pin	.02			
2330-16	Collector Arm Assen	.40			
671-107	Collector Rivet	.05			
671-108	Collector Spring	.02			
2330-42	Collector Insulation	.05			
671-112	Coil Insulator Washer	.02			
56-15	#4 Lockwasher	.02			
2333-42	Insulating Washer	.05			
2330-3	Collector Sleevng	.05			
<u>Pilot Truck Assembly</u>			<u>Frame Assembly</u>		
2330-55	Pilot Truck Assen	3.50	2330-10	Frame Assembly	1.50
2330-58	Truck Pivot Serew	.05	2330-13	Battery Contact	.25
2332-76	Pilot	.50	2343-65	Rivet	.05
2340-33	Ground Washer	.05	2340-32	Speed Clip	.05
2332-78	Bottom Plate Assen	.35			
6TC-12	Shoe Spring	.05			
483-7	Eyelet	.02			
6TC-10	Coupler & Coil Assy.	.60			
			<u>Miscellaneous</u>		
			100-25	Reversing Unit	2.75
			#4x1/4"	S.T.R.H."Z"(Rev U Sc)	.02
			2330-50	Pilot Truck Brkt. Assy.	.35
			2023-34	Horn Assy.	2.00
			#6x3/16	S.T.B.H.I."Z"HornMtgS	.02
			2330-45	Lamp Socket Assen	.35
			363-300	Lamp	.20
			2332P-1	Pantograph Complete	3.00
			2332P-7	Pantograph Insulator	.10
			2332P-6	Pantograph Spring	.05
			<u>Relay Assembly</u>		
			2330-125	Relay Complete	2.00
			2330-21	Relay Bracket	.15
			2330-22	Relay Insulation	.05
			WS-69	Lockwasher	.02
			6/32x1/4"	R.H.I.(Relay Mtg Sc)	.02