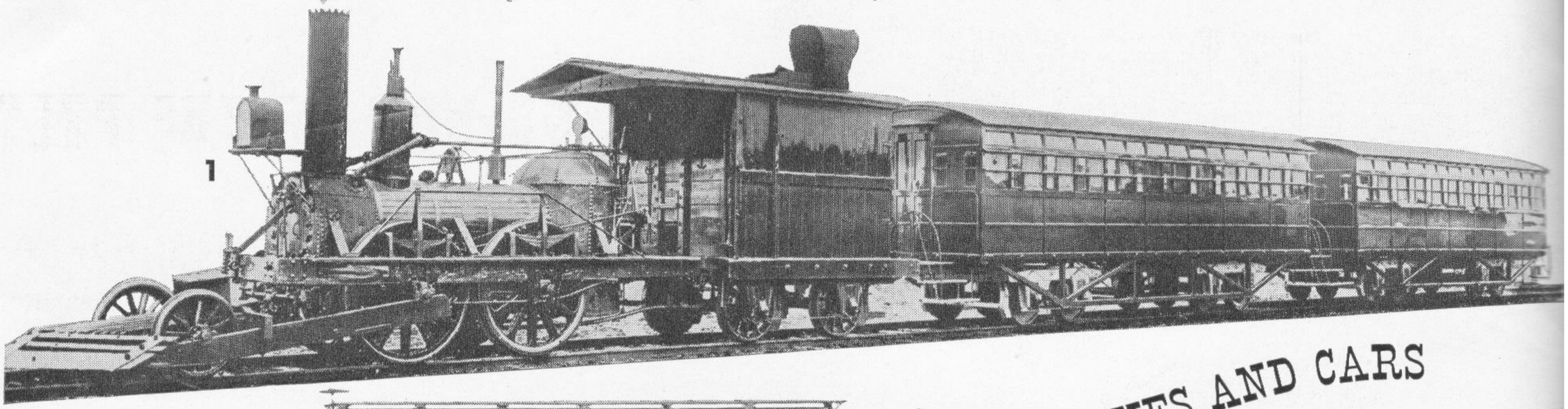
MODERN LOCOMOTIVES AND CARS 1939

PENNSYLVANIA RAILROAD



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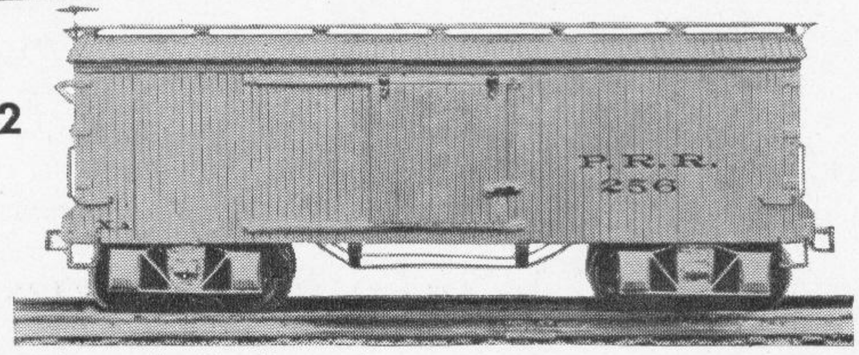
LOCOMOTIVES AND CARS OF EARLY DAYS



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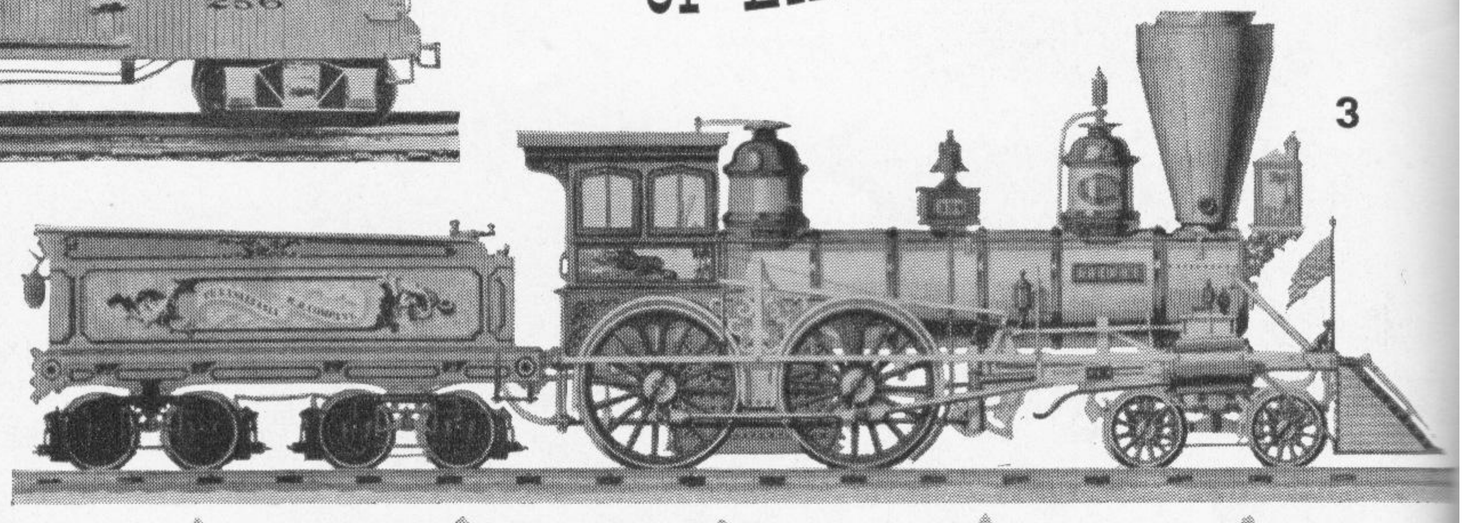

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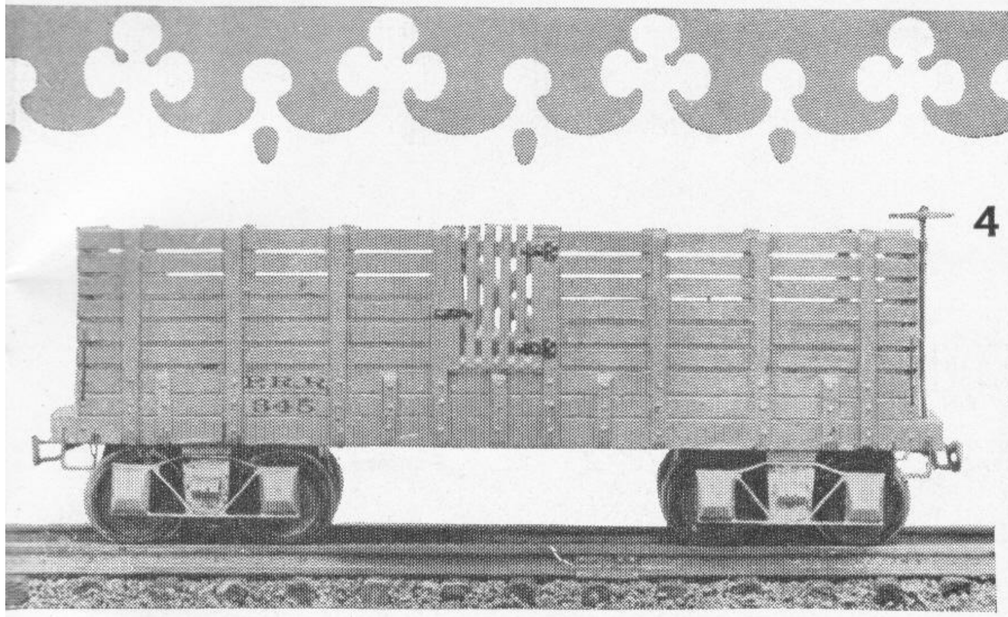
1. The "John Bull," placed in service on the Camden and Amboy Railroad in 1831, was the first locomotive used on any line now included in the Pennsylvania System. The old Camden and Amboy Railroad is now part of the New York Division.

The other pictures are typical examples of equipment in use on the Pennsylvania Railroad about eighty years ago, and are as follows: (2) Box car, (3) Passenger locomotive built in 1856, (4) Open top stock car, (5) four-wheeled coal car, (6) Passenger coach.



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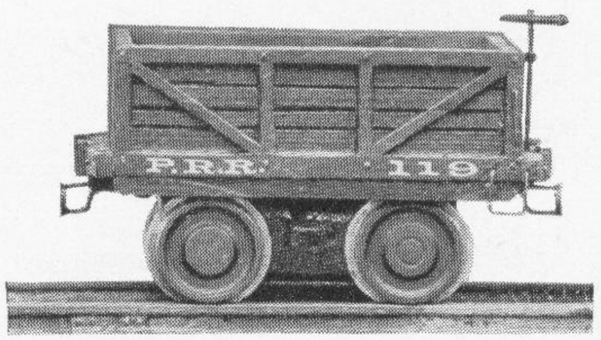

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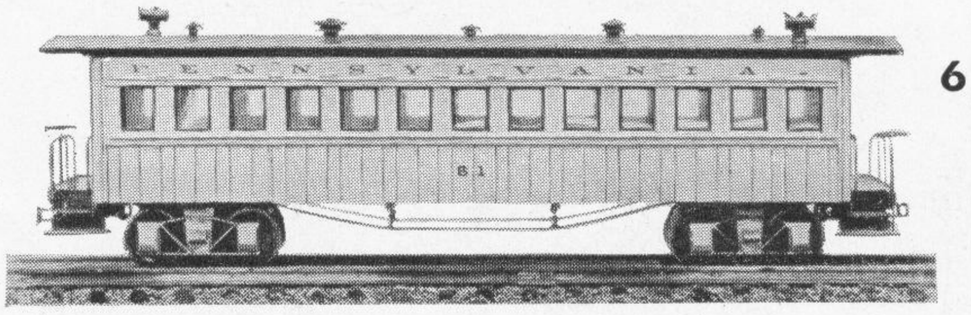

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. . . AND NOW TO THE PRESENT

We live in a fast-moving age. As one of our foremost business leaders aptly put it, "The only thing certain about the present is *change*." He might well have been speaking about the Pennsylvania Railroad, because its policy is, and always has been, to build for the future, and thus anticipate transportation needs. As a result, the Pennsylvania Railroad has long been recognized as a leader in the advancement of the science of railroading.

Today the Pennsylvania Railroad operates the largest fleet of air-conditioned trains in the world and provides in its east and west blue ribbon passenger service a *Fleet of Modernism*. It has introduced the most advanced types of freight cars adapted to every need of industry, as well as the highly popular pick-up and delivery service, from door to door, by rail and truck, for less than carload merchandise shipments. In addition to its extensive steam-powered operation, it possesses the greatest electrified railroad system in the country (40% of the electrified standard railroad trackage in the United States is on the Pennsylvania Railroad).

A PIONEER IN PROGRESS

And now, this year it is placing on the rails the largest, fastest, most powerful passenger steam locomotive, capable of sustained speeds of more than 100 miles an hour. All of this is a result

of a long tradition of keeping ahead — not merely abreast — of the times. The Pennsylvania Railroad has pioneered in developing and adopting many of the fundamental improvements by which the art of railroading has been advanced, among them the use of steel rails to replace iron, the adoption of the air brake, the use of the telephone in railroading, and the installation of switch and signal interlockings. Other outstanding contributions to safety have been the adoption of block and position light signals, the introduction of the cab signal, and the adoption of all-steel construction as the standard for passenger cars and freight cars.

THOUSANDS OF TRAINS

With thousands of trains speeding over its tracks every day and night, the Pennsylvania Railroad requires many locomotives and passenger and freight cars. Likewise, the extent of its lines and the variety and scope of its services necessitate locomotives and cars of many types.

On January 1, 1939, the rolling stock of the Pennsylvania Railroad comprised the following:

EQUIPMENT	Number Owned by PRR System	% of Total All Class 1 Railroads
Locomotive (Steam and Electric)	4,753	10.6
Passenger Cars	6,499*	16.2
Freight Cars	238,101	13.4

*Does not include Pullman cars operated on P.R.R.

With the famous Tuscan-red color of Pennsylvania Railroad cars, and the various types of locomotives used to haul them, the Pennsylvania's many patrons are generally familiar. Probably, however, no one is acquainted with them all.

It is hoped, therefore, that this booklet will be of interest to those who wish to know something more about present Pennsylvania Railroad equipment, since it typifies advanced achievements in design and construction, representing the accumulated experience of more than a century of American railroad operation.

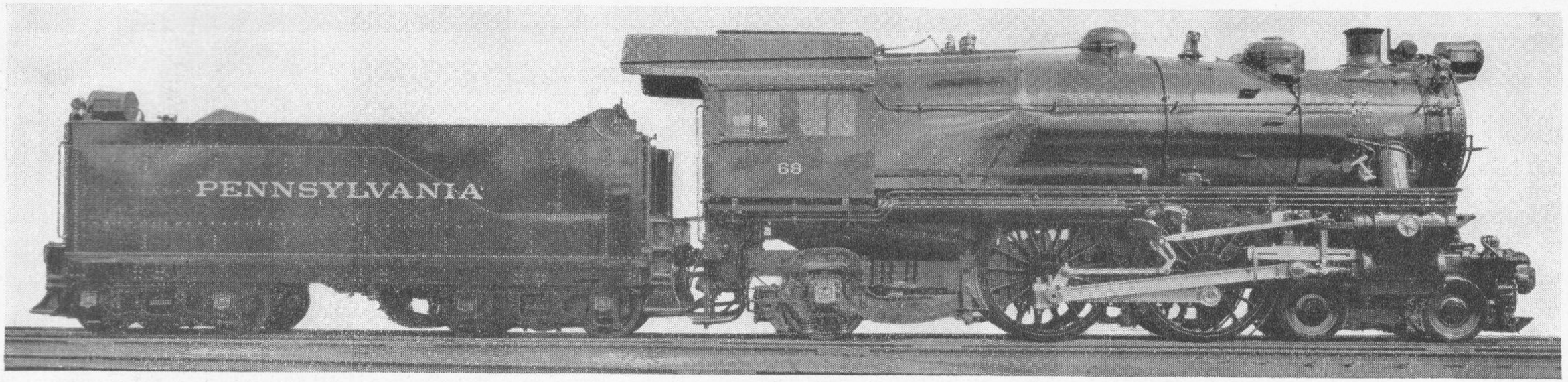
HOW LOCOMOTIVES AND CARS ARE CLASSIFIED

Locomotives are classified in this booklet according to the Whyte system, which is in general use and, in addition, the Pennsylvania Railroad classifications are shown.

The Whyte system is based on the representation by numerals of the number and arrangement of the wheels, beginning at the front. For example, a Pacific type locomotive with a four-wheeled leading truck, three pairs of driving wheels and two trailing wheels is designated as a 4-6-2 type.

In the Pennsylvania classifications, locomotives are grouped in typical classes according to the wheel arrangement, using a primary letter to designate the type. Successive designs of a type are designated by numerals following the primary class letter. The suffix "s" after the numeral indicates that the locomotive is equipped with superheater. Use of the suffix "s" has been discontinued on locomotives of the most recent designs, although the superheater is employed.

In the classification of cars, the different types are designated by primary letters, and the successive designs of a type by numerals following the primary letters, modifications in a design being indicated by a small suffix letter. Passenger train cars designed to be equipped with electric motors are designated by the letter "M," placed before the primary letter or letters.

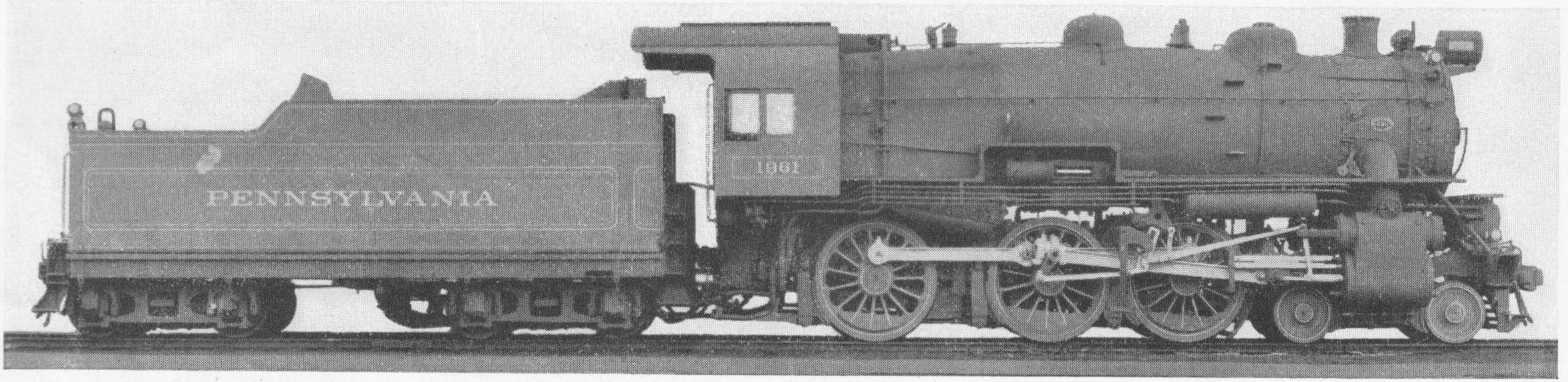


STEAM PASSENGER LOCOMOTIVE

For the lighter passenger service.

Atlantic (4-4-2) Type
Cylinders, 23½-inch diameter, 26-inch stroke
Steam Pressure, 205 pounds per square inch
Driving Wheel Diameter . . . . . 80 inches
Weight on Driving Wheels . 136,000 pounds

Class E-6s
Total Weight of Locomotive and Tender in Working Order, 411,250 pounds
Tractive Effort . . . . 31,275 pounds

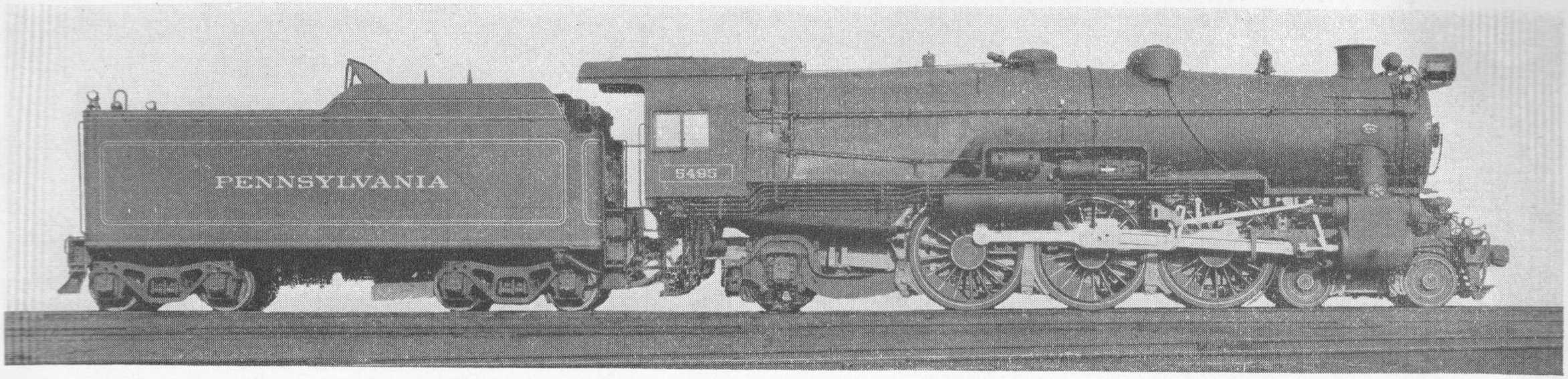


STEAM PASSENGER LOCOMOTIVE

For local passenger service.

Ten-Wheel (4-6-0) Type
Cylinders, 24-inch diameter, 28-inch stroke
Steam Pressure, 205 pounds per square inch
Driving Wheel Diameter . . . . . 68 inches
Weight on Driving Wheels . 178,000 pounds

Class G-5s
Total Weight of Locomotive and Tender in Working Order, 409,900 pounds
Tractive Effort . . . . 41,328 pounds

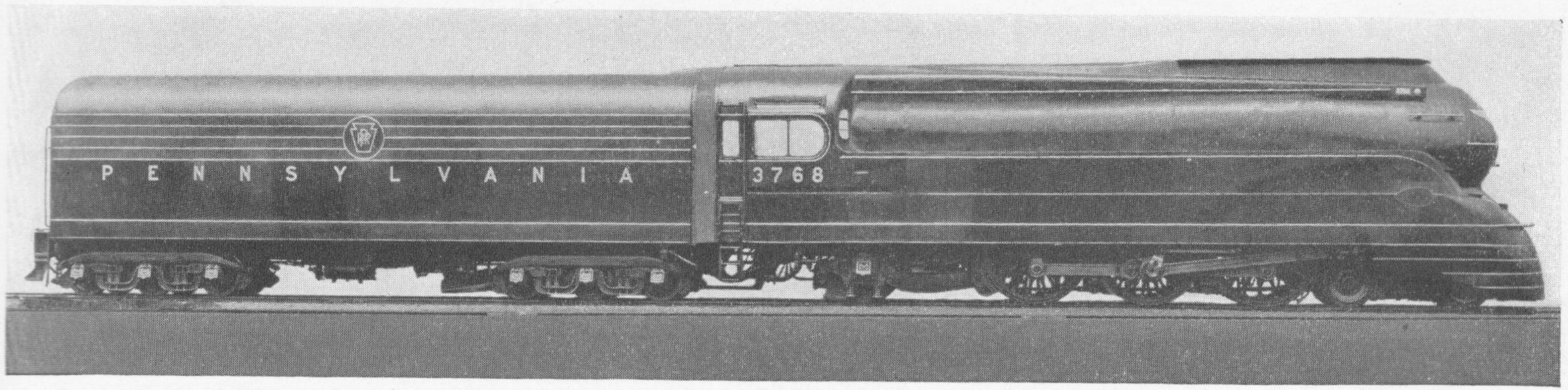


STEAM PASSENGER LOCOMOTIVE

For high-speed through passenger service.

Pacific (4-6-2) Type
Cylinders, 27-inch diameter, 28-inch stroke
Steam Pressure . . 205 pounds per square inch
Driving Wheel Diameter . . . . . 80 inches
Weight on Driving Wheels, 209,300 pounds

Class K-4s
Total Weight of Locomotive and Tender in Working Order, 541,150 pounds
Tractive Effort . . . . 44,460 pounds

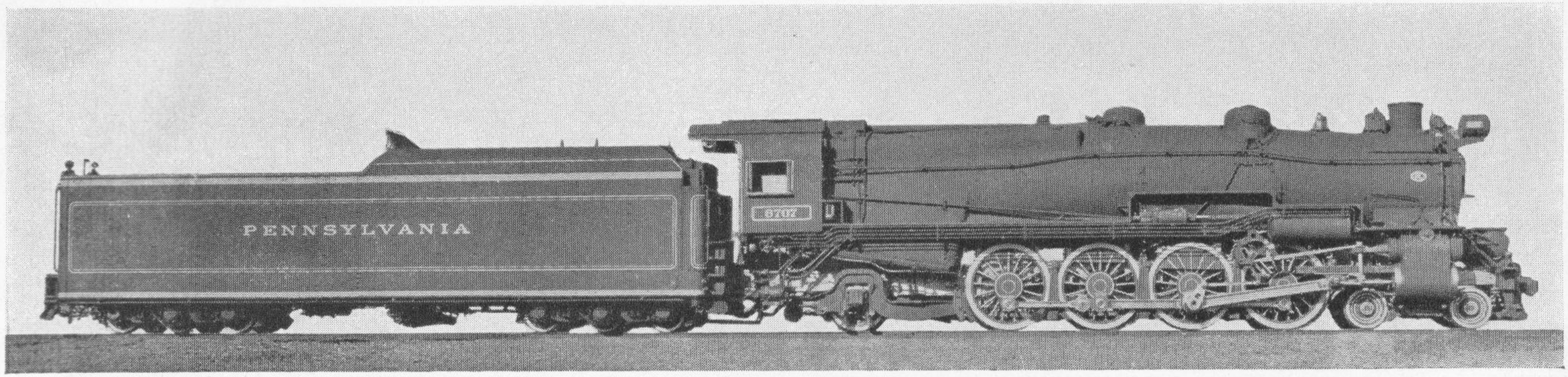


STEAM PASSENGER LOCOMOTIVE

For high-speed through passenger service.

Pacific (4-6-2) Type
Cylinders, 27-inch diameter, 28-inch stroke
Steam Pressure, 205 pounds per square inch
Driving Wheel Diameter . . . . . 80 inches
Weight on Driving Wheels, 223,000 pounds

Class K-4s Streamlined
Total Weight of Locomotive and Tender in Working Order, 630,000 pounds
Tractive Effort . . . . . 44,460 pounds

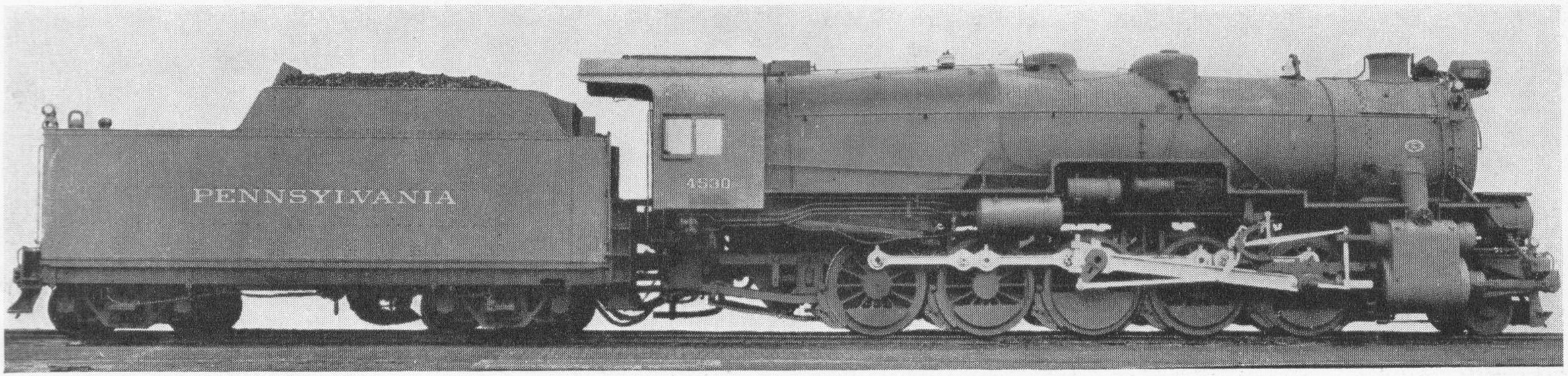


STEAM PASSENGER OR FREIGHT LOCOMOTIVE

For heavy through passenger service or fast freight service.

Mountain (4-8-2) Type
Cylinders: 27-inch diameter, 30-inch stroke
Steam Pressure . . 250 pounds per square inch
Driving Wheel Diameter . . . . . 72 inches
Weight on Driving Wheels, 271,000 pounds

Class M-1a
Total Weight of Locomotive and Tender in Working Order, 768,360 pounds
Tractive Effort . . . . 64,550 pounds



STEAM FREIGHT LOCOMOTIVE

For the heaviest freight service.

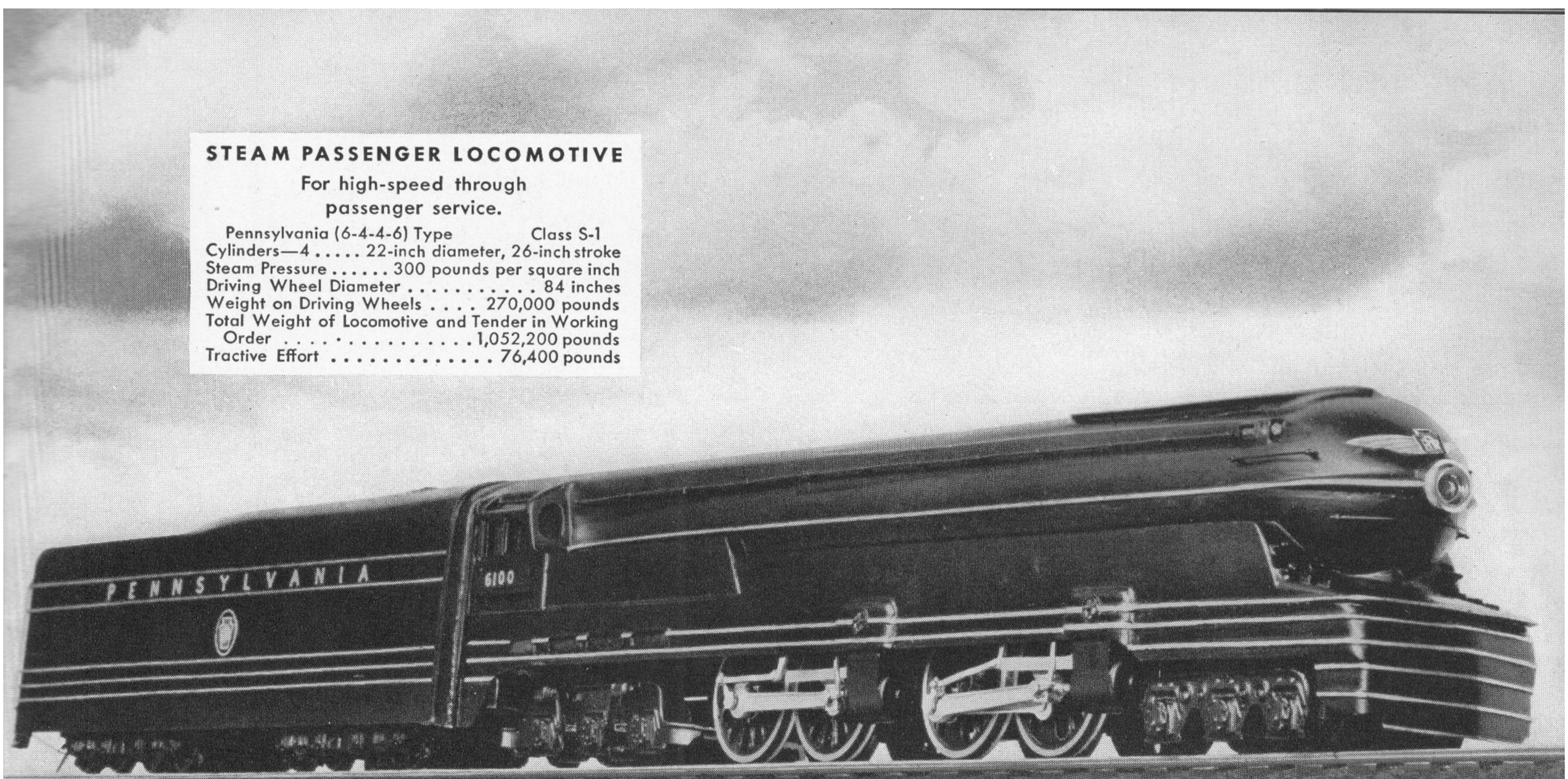
Decapod (2-10-0) Type
Cylinders: 30½-inch diameter, 32-inch stroke
Steam Pressure . . 250 pounds per square inch
Driving Wheel Diameter . . . . . 62 inches
Weight on Driving Wheels . 352,500 pounds

Class 1-1s
Total Weight of Locomotive and Tender in Working Order, 590,800 pounds
Tractive Effort . . . . 90,000 pounds

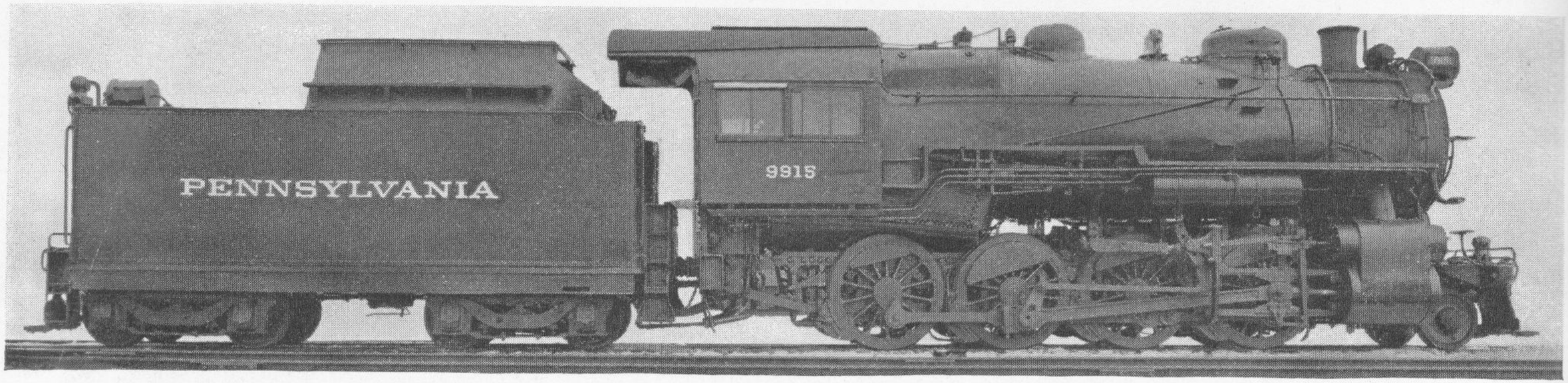
STEAM PASSENGER LOCOMOTIVE

For high-speed through passenger service.

Pennsylvania (6-4-4-6) Type	Class S-1
Cylinders—4	22-inch diameter, 26-inch stroke
Steam Pressure	300 pounds per square inch
Driving Wheel Diameter	84 inches
Weight on Driving Wheels	270,000 pounds
Total Weight of Locomotive and Tender in Working Order	1,052,200 pounds
Tractive Effort	76,400 pounds



Designed to combine power, speed and economy of operation to a degree never before achieved, the fully streamlined new Class S-1 is expected to anticipate steam locomotive development for years to come. In distinction from more conventional types, it is equipped with four cylinders instead of two, each pair of cylinders providing power for two pairs of driving wheels. This locomotive is the outcome of extensive studies of modern trends in railroad operation and motive power and the requirements of the future. It is capable of sustained speeds of more than 100 miles per hour.

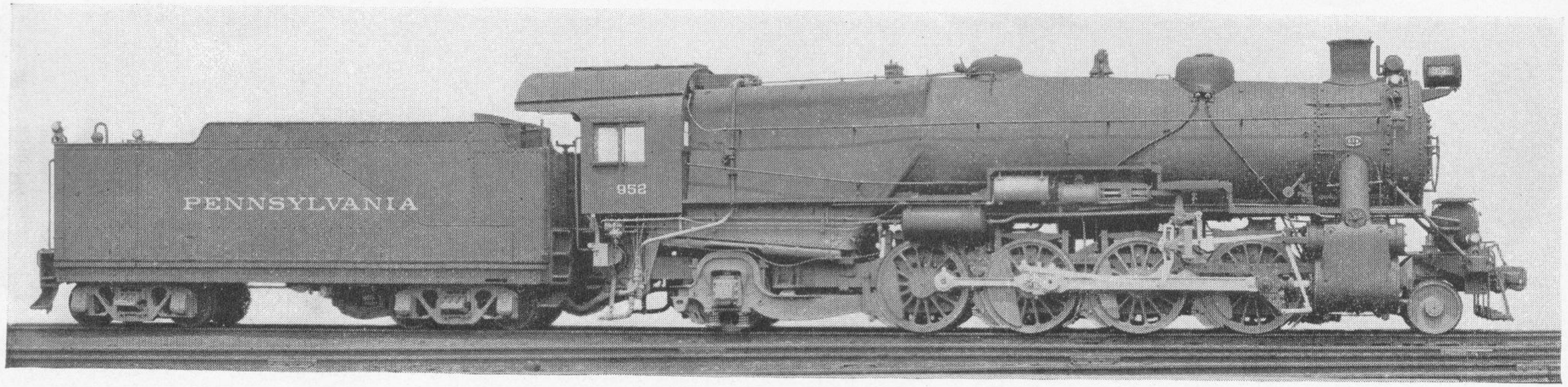


STEAM FREIGHT LOCOMOTIVE

Largely used in local freight and branch line service.

Consolidation (2-8-0) Type
Cylinders: 26-inch diameter, 28-inch stroke
Steam Pressure . . 205 pounds per square inch
Driving Wheel Diameter . . . . . 62 inches
Weight on Driving Wheels . 223,000 pounds

Class H-10s
Total Weight of Locomotive and Tender in Working Order, 424,050 pounds
Tractive Effort . . . . . 53,197 pounds

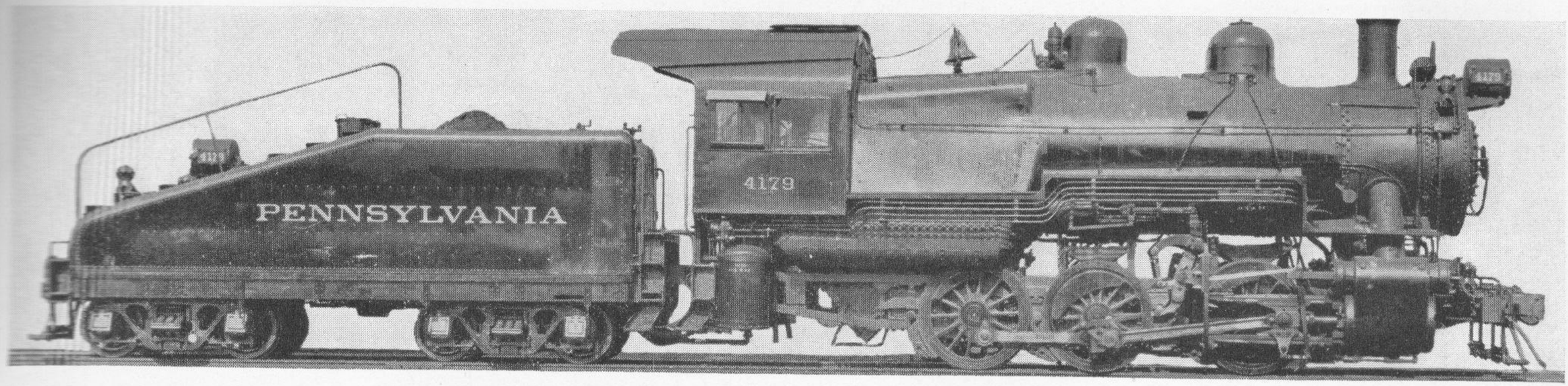


STEAM FREIGHT LOCOMOTIVE

For heavy freight service.

Mikado (2-8-2) Type
Cylinders: 27-inch diameter, 30-inch stroke
Steam Pressure . . 205 pounds per square inch
Driving Wheel Diameter . . . . . 62 inches
Weight on Driving Wheels . 240,200 pounds

Class L-1s
Total Weight of Locomotive and Tender in Working Order, 497,050 pounds
Tractive Effort . . . . . 61,465 pounds

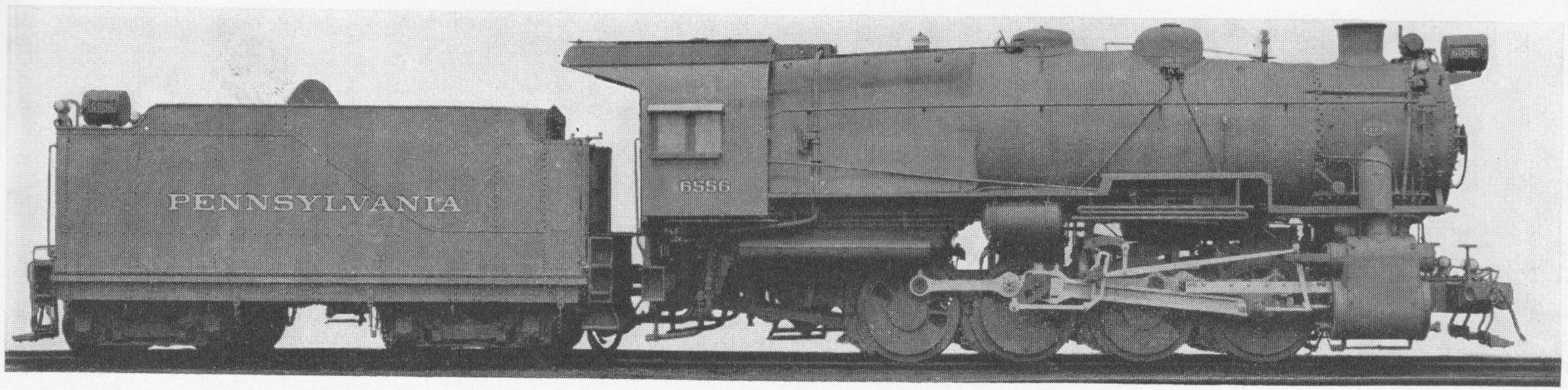


STEAM SWITCHING LOCOMOTIVE

For general switching service.

Six-Wheel (0-6-0) Type
Cylinders: 22-inch diameter, 24-inch stroke
Steam Pressure . . 205 pounds per square inch
Driving Wheel Diameter . . . . . 56 inches
Weight on Driving Wheels . 180,300 pounds

Class B-6sb
Total Weight of Locomotive and Tender in Working Order, 305,300 pounds
Tractive Effort . . . . 36,144 pounds



STEAM SWITCHING LOCOMOTIVE

For heavy switching and hump service.

Eight-Wheel (0-8-0) Type
Cylinders . . 27-inch diameter, 30-inch stroke
Steam Pressure, 250 pounds per square inch
Driving Wheel Diameter . . . . . 56 inches
Weight on Driving Wheels, 278,000 pounds

Class C-1
Total Weight of Locomotive and Tender in Working Order, 435,250 pounds
Tractive Effort . . . . 76,154 pounds

ELECTRIC SWITCHING LOCOMOTIVE

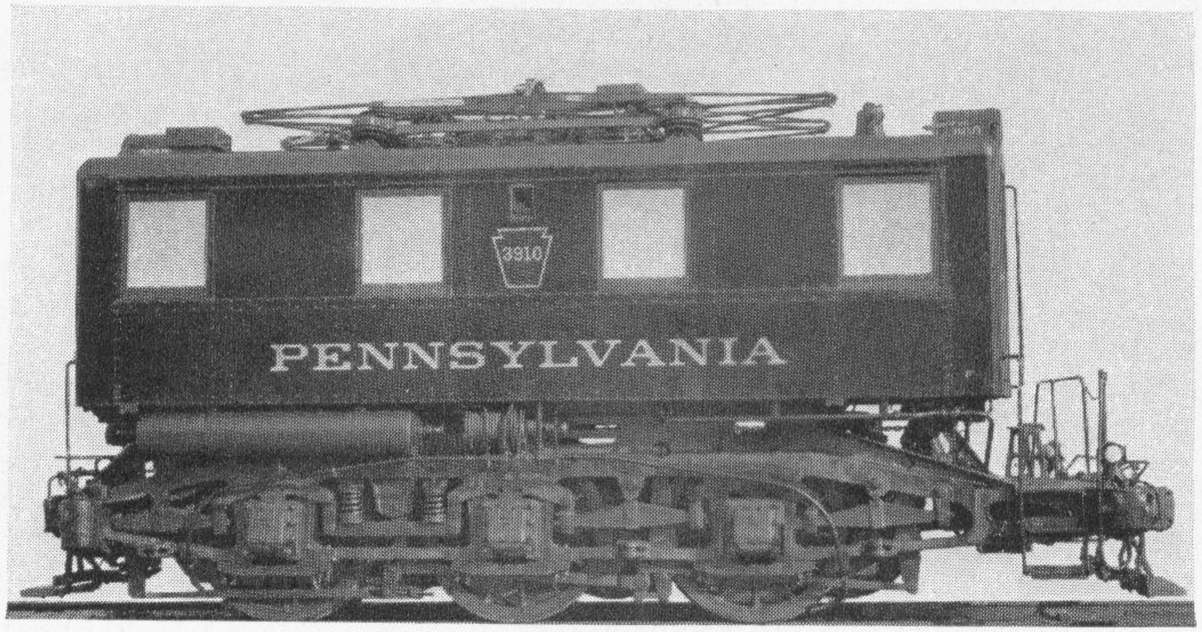
For general switching service.

Type (0-6-0) Class B-1

Driving Wheel Diameter . . . . . 62 inches

Tractive Effort . . . . . 50,000 pounds

Weight on Driving Wheels and Total Weight . . . . . 157,045 pounds



ELECTRIC PASSENGER OR FREIGHT LOCOMOTIVE

For general service.

Type (4-6-4) Class P-5a

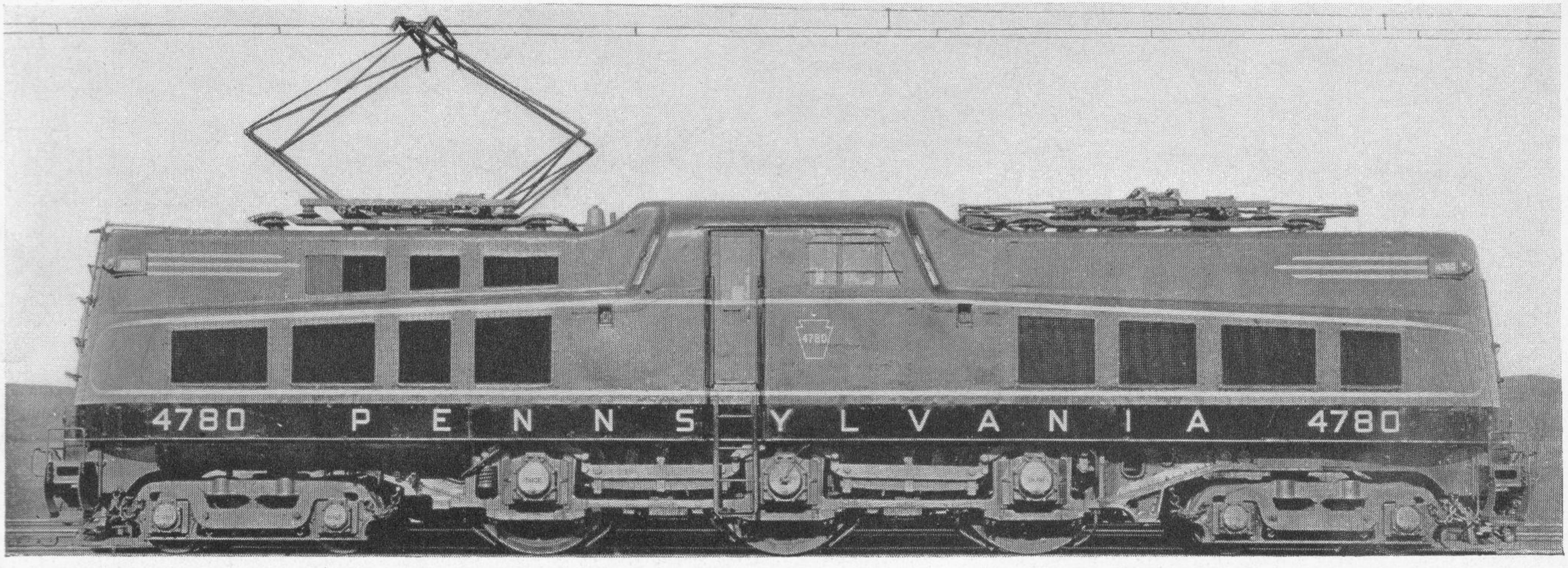
P-5a built after 5-1-34

Driving Wheel Diameter . . 72 inches

Weight on Driving Wheels . . . 229,000 pounds

Total Weight in Working Order . 394,000 pounds

Maximum Tractive Effort . . . . . 56,250 pounds



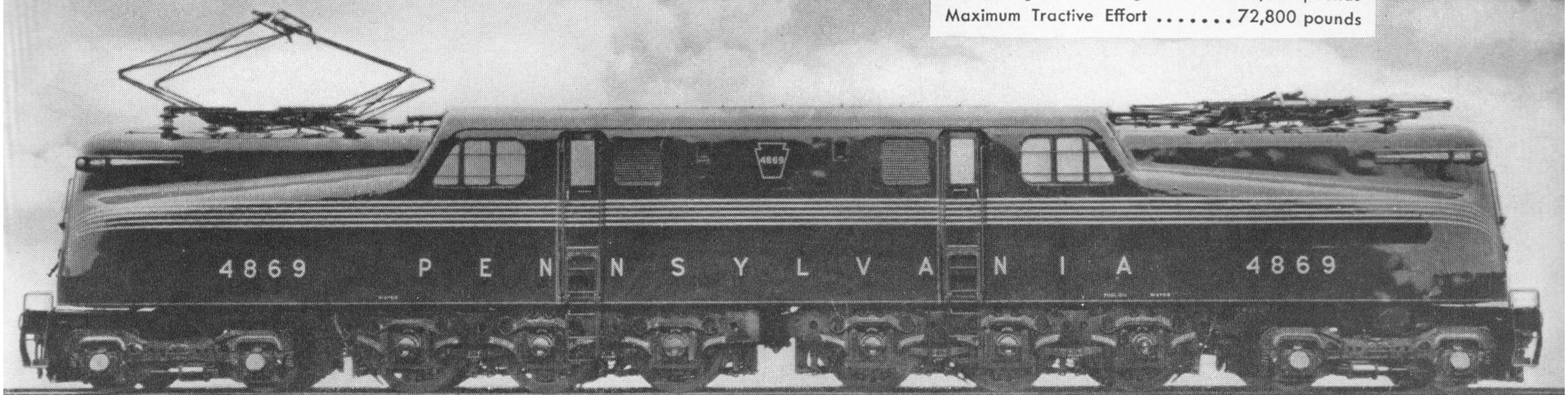
ELECTRIC PASSENGER LOCOMOTIVE

For high-speed through passenger service.
Also used in fast freight service.

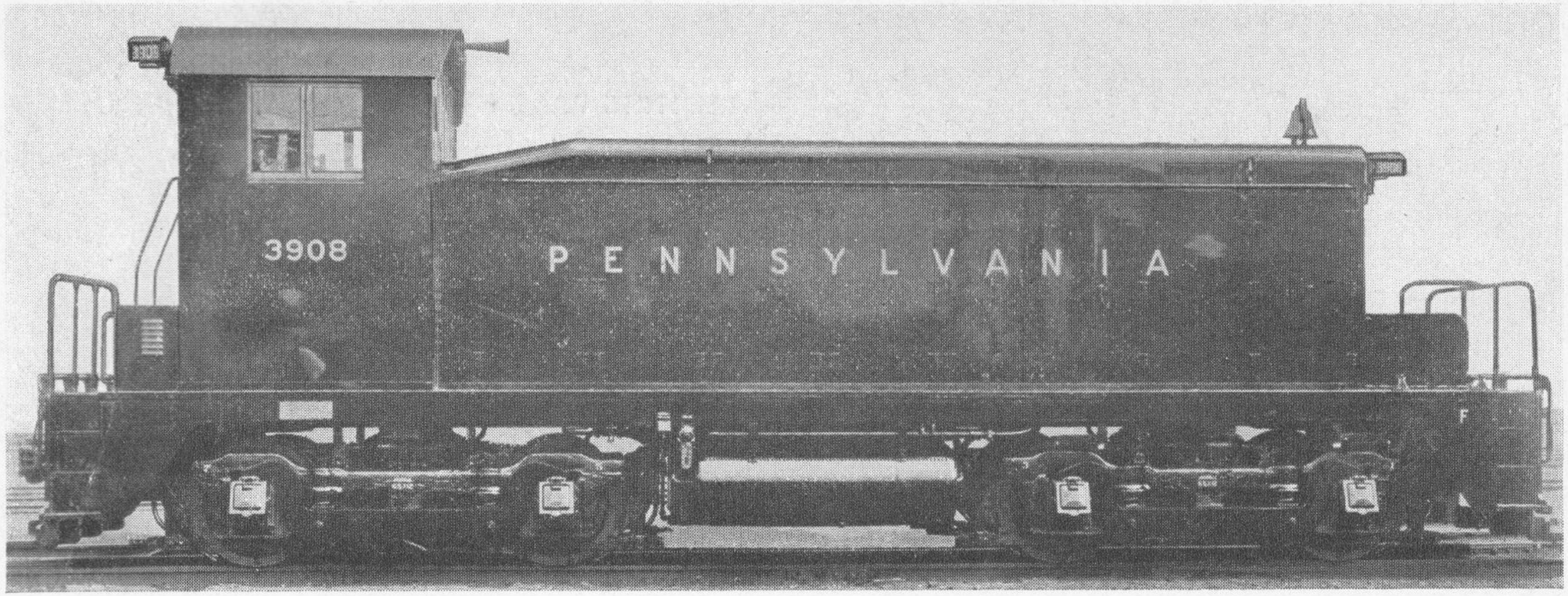
Type (4-6-0—0-6-4) Class GG-1

GG-1 built after 1-1-37

Driving Wheel Diameter	57 inches
Weight on Driving Wheels	303,000 pounds
Total Weight in Working Order	477,000 pounds
Maximum Tractive Effort	72,800 pounds



The Class GG-1 is the most powerful electric passenger locomotive of its type ever built and the first to be streamlined. Primarily designed to meet the requirements of the high-speed passenger service in the electrified territory between New York, Philadelphia, Baltimore, Washington and Harrisburg, it is capable of hauling passenger trains at sustained speeds of 90 to 100 miles per hour. In addition, it has proved itself equally adaptable to the high-speed freight service and is extensively so used.



DIESEL ELECTRIC SWITCHING LOCOMOTIVE

For switching service.

Class AA-5

Weight on Drivers & Total Weight . 200,000 Lbs.

Diameter Drivers . . 40″

Maximum Tractive Effort 60,000 Lbs.

Engine—Diesel, 8 Cyl., 8″ x 10″, 2 Cycle, 600 H.P. at 750 R.P.M.

Traction Motors . . . 4

GAS-ELECTRIC RAIL MOTOR CAR

For branch line passenger service.

Class GEG-415

Length . . . . . 75′ 0″

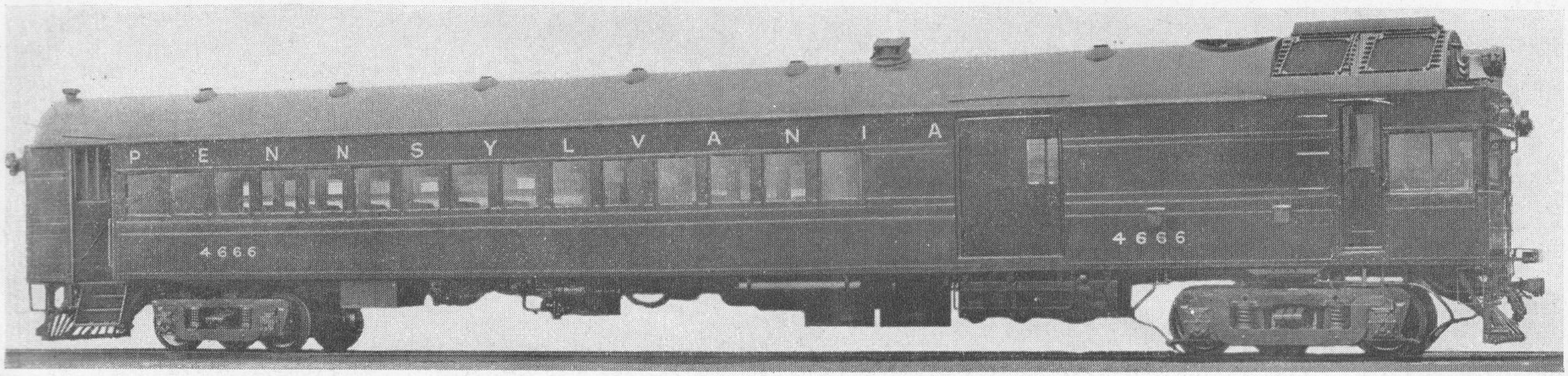
Weight . . . . . 139,500 Lbs.

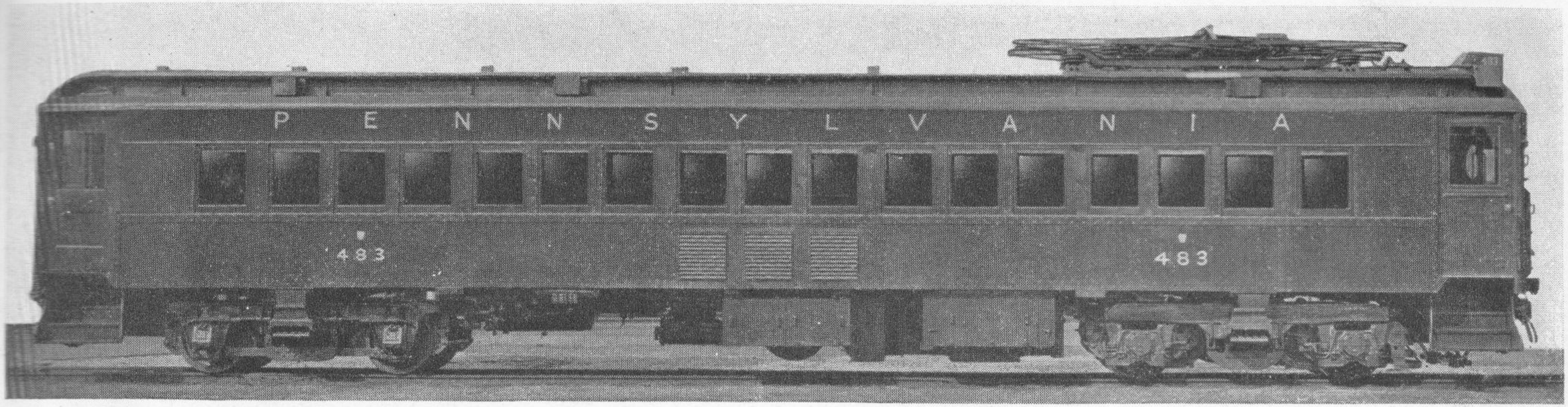
Seating Capacity 66

Engine—4-Cycle, 6 Cyl., 8¾″ x 10½″, Rated 415 H.P.

Generator Rated Capacity . . 336 K.W.

Traction Motors, 2—Rated 220 H.P. each





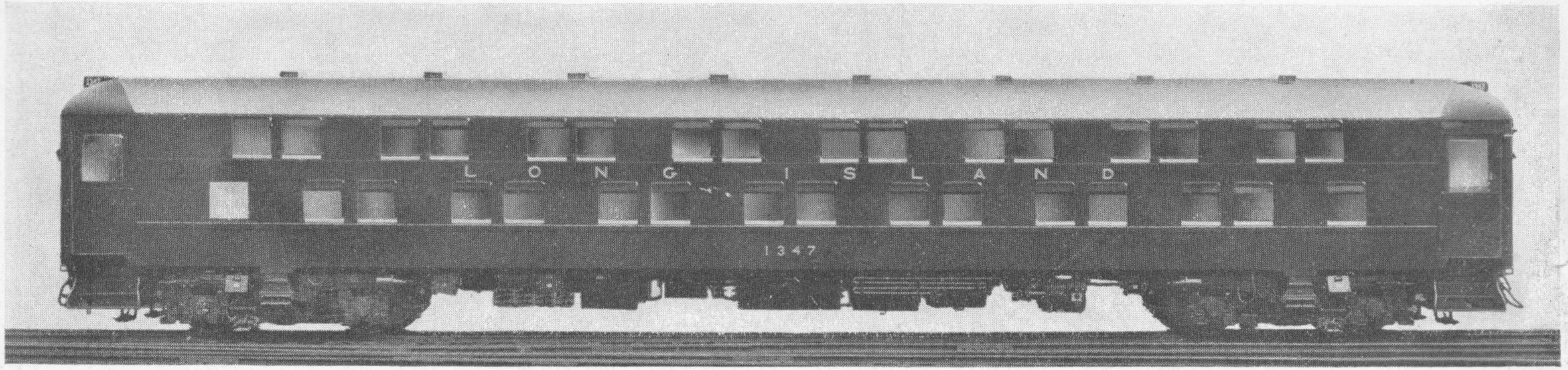
COACH (ELECTRIC)

For multiple-unit operation in suburban and local trains.

Class MP-54E3

Length of body, inside	53′ 7⅜″	Seating capacity	72
Width of body, inside	9′ 1⅛″	Weight	127,000 Lbs.
Length of car, coupled	64′ 0½″		

Without electrical equipment, used in local steam trains—weight 90,000 lbs.



COACH, DOUBLE DECK (ELECTRIC)

For multiple-unit operation in suburban service.

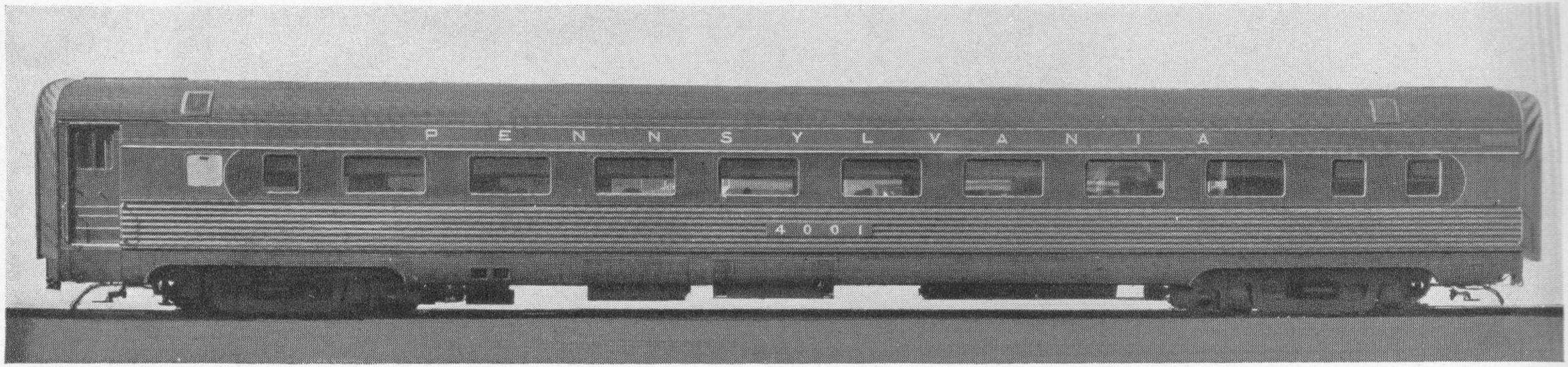
Class MP-70

Length of body, inside	69′ 5½″	Capacity—passengers	134
Width of body, inside	9′ 3″	Weight	120,800 Lbs.
Length of car, coupled	80′ 3¼″		

All-aluminum construction. Forced air ventilation.

Semi permanently coupled to trailer car of same construction.

Weight of trailer car—94,200 lbs.

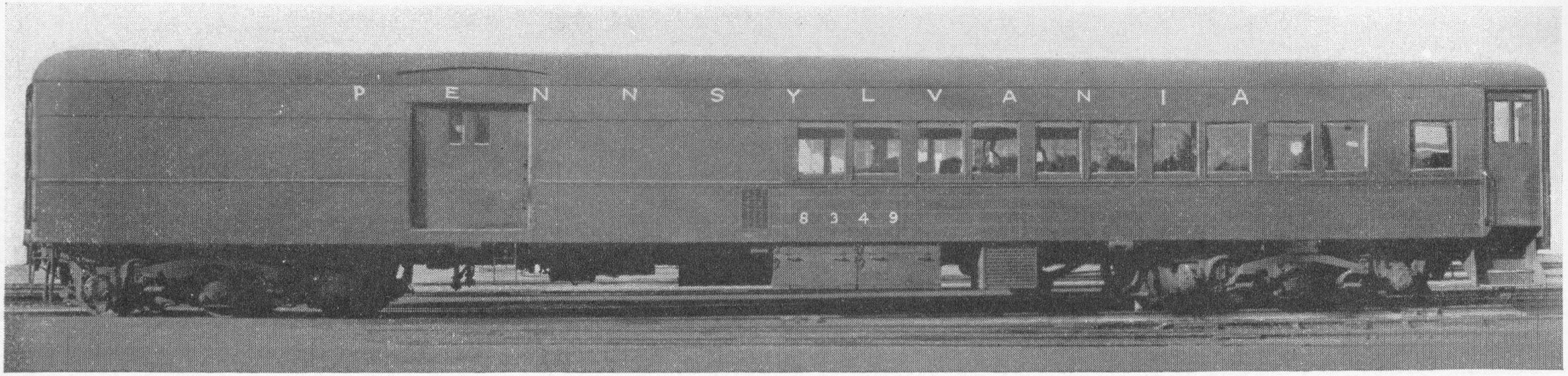


COACH

For through service.

Class P-82R

Length of body, inside	78′ 6″	Seating capacity	66
Width of body, inside	9′ 3⅛″	Weight	105,000 lbs.
Length of car, coupled	84′ 8″	Air-conditioned	



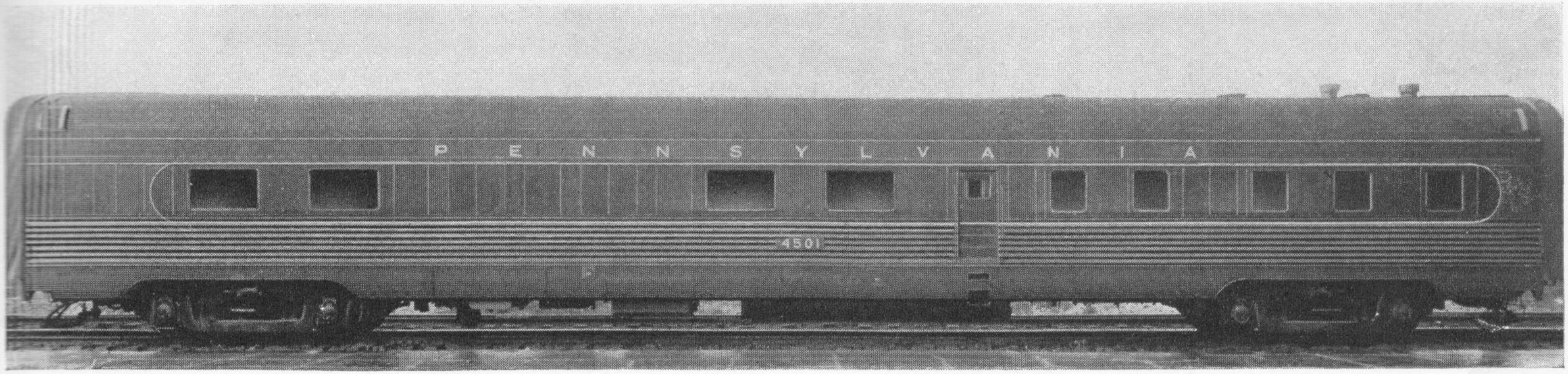
COMBINED PASSENGER AND BAGGAGE CAR

For general service.

Class PB-70DR

Length of body, inside	70′ 4¼″	Seating capacity	44
Width of body, inside	9′ 1⅛″	Baggage capacity	35,000 Lbs.
Length of car, coupled	77′ 3½″	Weight	145,570 Lbs.

Passenger compartment air-conditioned.

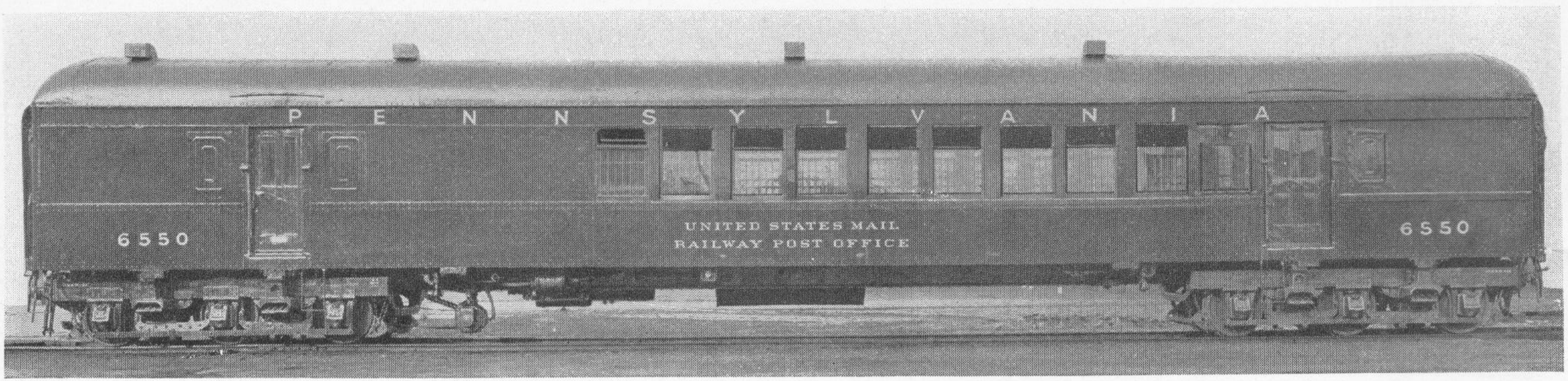


DINING CAR

For general service.

Class D-82R

Length of body, inside	82′ 0″	Seating capacity	44
Width of body, inside	9′ 3⅜″	Weight	113,000 Lbs.
Length of car, coupled	84′ 8″	Air-conditioned	

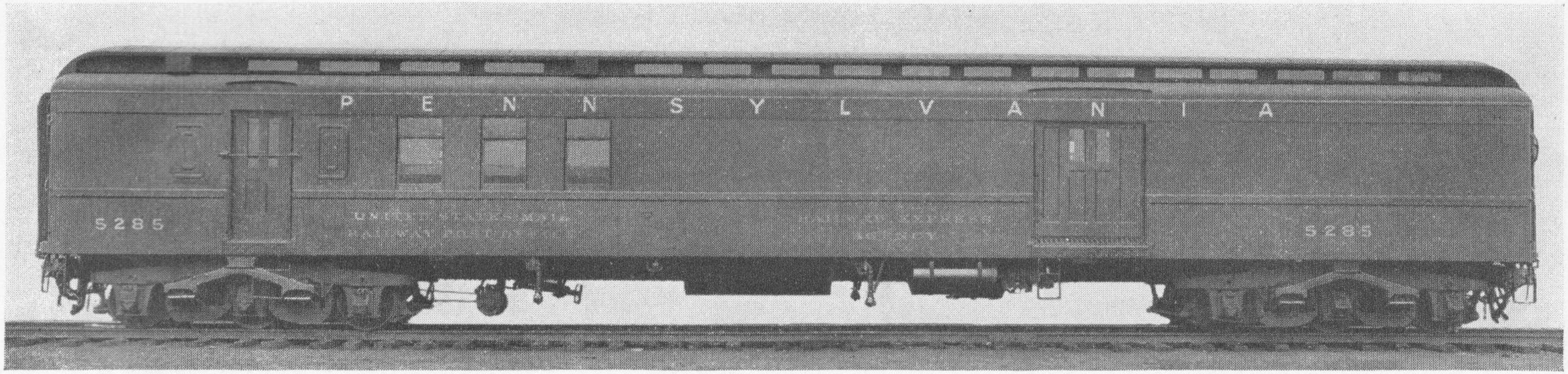


MAIL CAR

For general service.

Class M-70B

Length of body, inside	70′ 9¼″	Capacity	30,000 Lbs.
Width of body, inside	9′ 1″	Weight	125,000 Lbs.
Length of car, coupled	74′ 4½″		

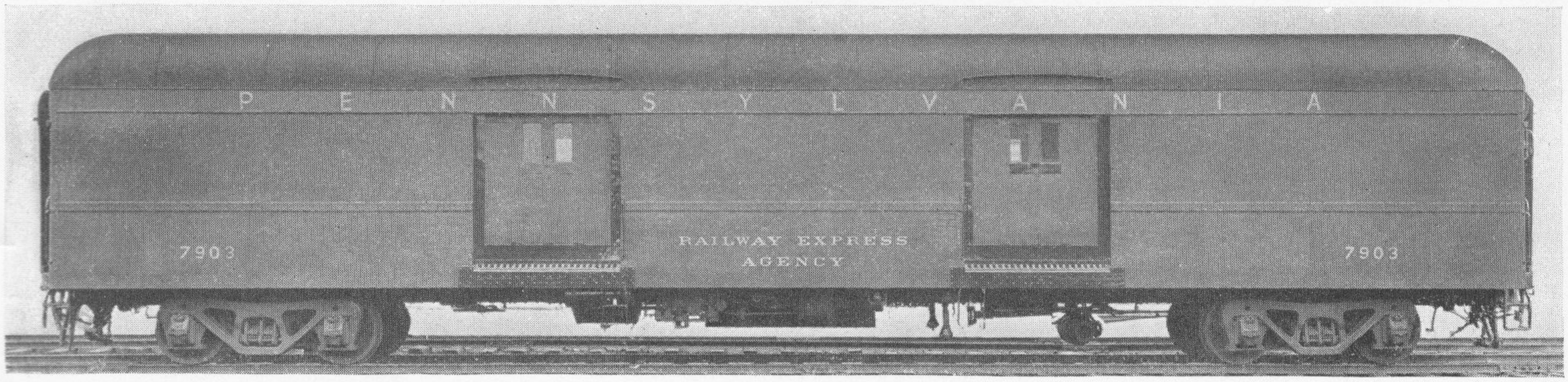


BAGGAGE AND MAIL CAR

For general service.

Class BM-70K

Length of body, inside	70′ 9⅛″	Capacity Baggage Compartment	40,000 Lbs.
Width of body, inside	9′ 1″		
Length of car, coupled	74′ 4½″	Weight	132,300 Lbs.

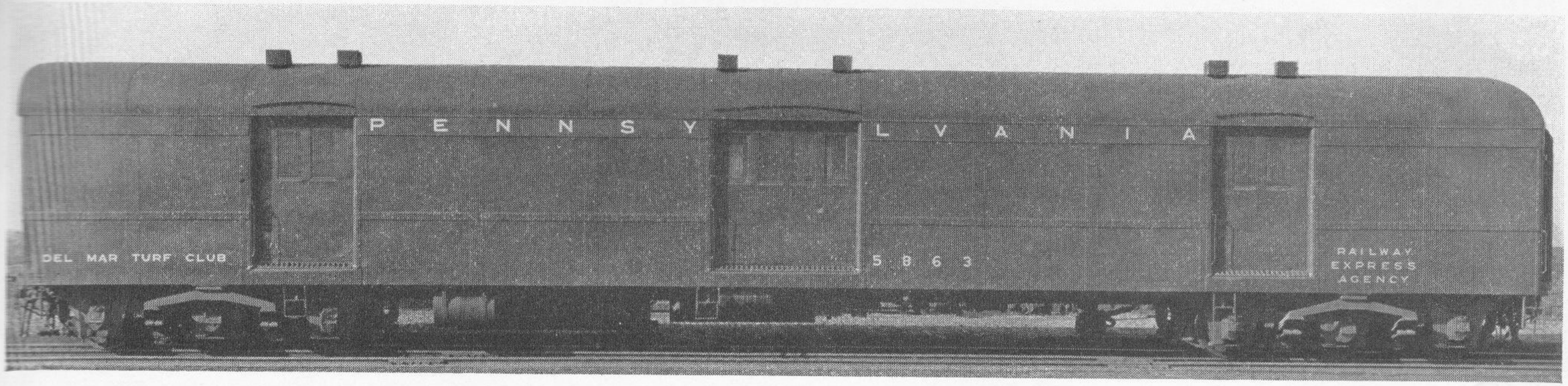


EXPRESS CAR

For general service.

Class B-60B

Length of body, inside	60′ 0″	Capacity	60,000 Lbs.
Width of body, inside	9′ 8¼″	Weight	101,300 Lbs.
Length of car, coupled	63′ 2″		

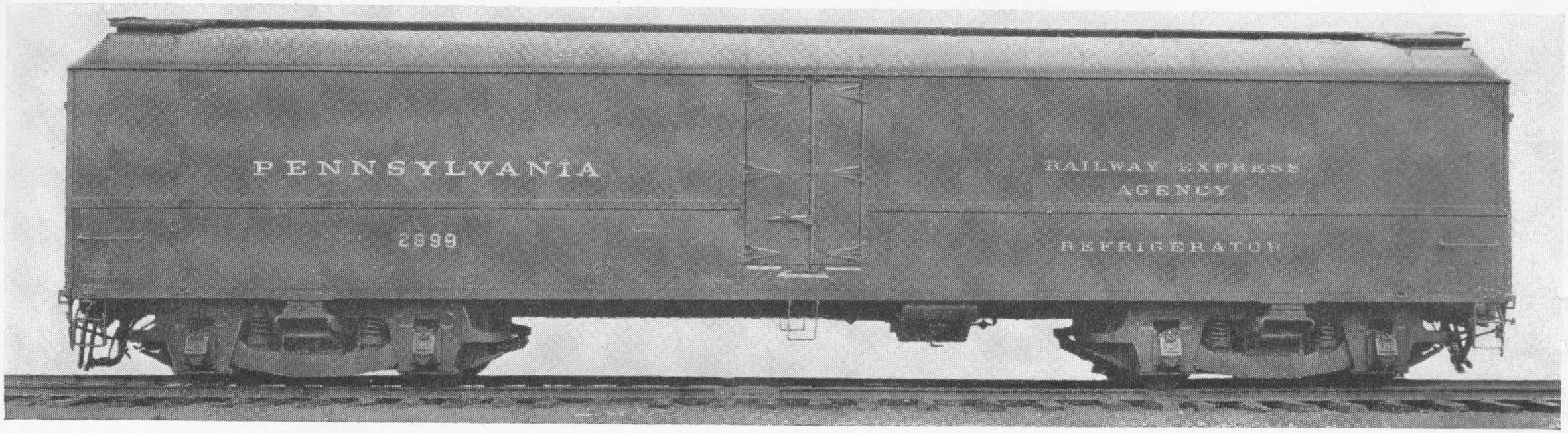


HORSE EXPRESS CAR

For race and other valuable horses.
Electric light, steam heat, adjustable stalls.
Large end doors for loading vehicles.

Class B-74B

Length of body, inside	73′ 8⅛″	Capacity	65,000 Lbs.
Width of body, inside	9′ 3″	Capacity	24 Horses
Length of car, coupled	77′ 9¼″	Weight	132,000 Lbs.

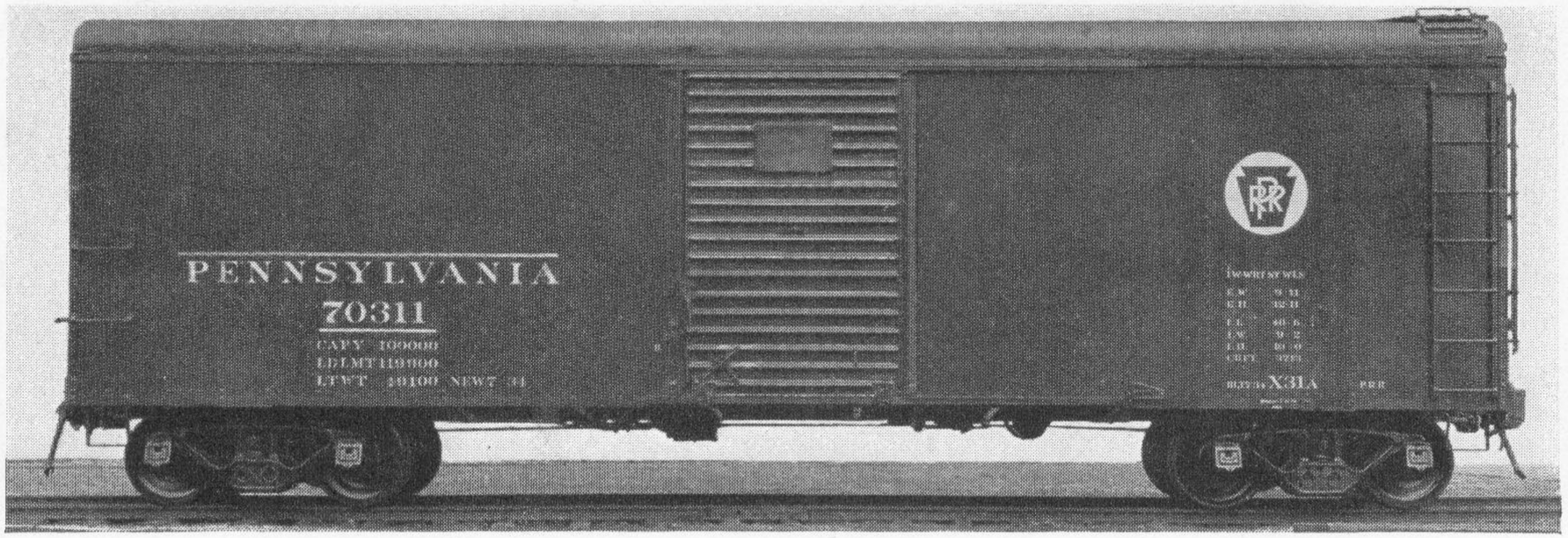


REFRIGERATOR EXPRESS CAR

For milk, fruit and other perishable products.

Class R-50B

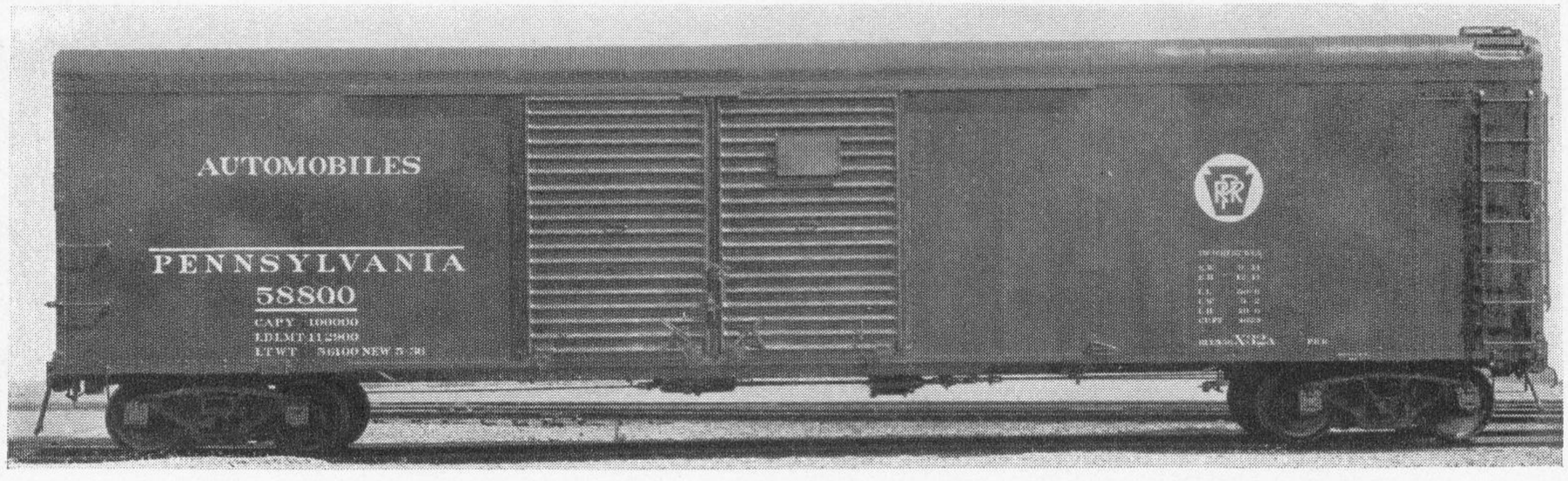
Length of body inside between bulkheads	42′ 5″	Capacity	40,000 Lbs.
Length of car, coupled	54′ 2″	Weight	95,000 Lbs.



BOX CAR

For general merchandise and grain.
All steel, wood lined, single door, 6′ 0″ opening.

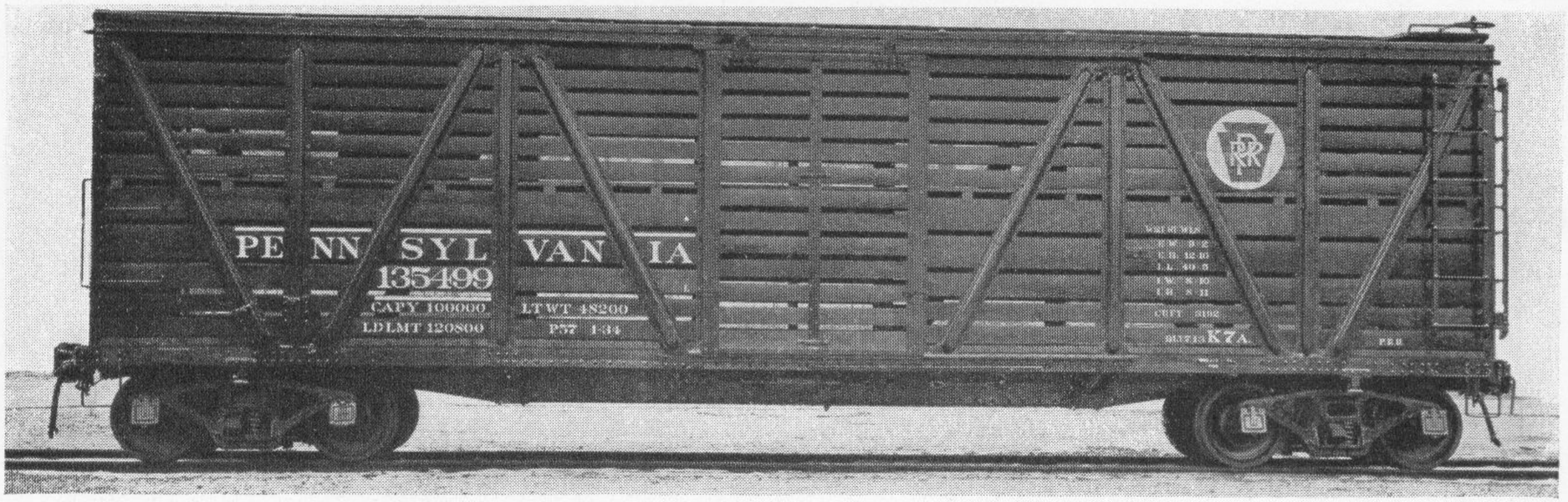
Class X-31A	
Length of body, inside	40′ 6″
Length of car, coupled	44′ 2⅛″
Capacity	100,000 Lbs.
Weight of car	49,100 Lbs.



AUTOMOBILE BOX CAR

For motor vehicles and bulky merchandise.
All steel, wood lined, double doors, 14′ 6″ opening.

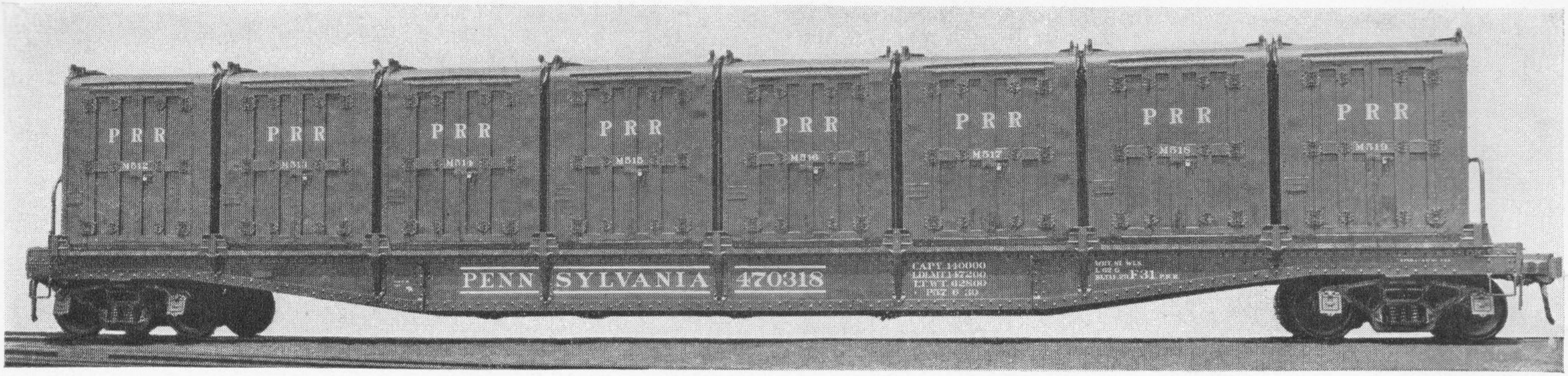
Class X-32A	
Length of body, inside	50′ 6″
Length of car, coupled	54′ 2⅛″
Capacity	100,000 Lbs.
Weight	56,100 Lbs.



STOCK CAR

For cattle and other livestock. Steel framed, wood lined, all-steel roof, single door, 6′ 1″ opening.

	Class K-7A
Length of body, inside	40′ 5½″
Length of car, coupled	44′ 6″
Capacity	100,000 Lbs.
Weight of car	48,200 Lbs.

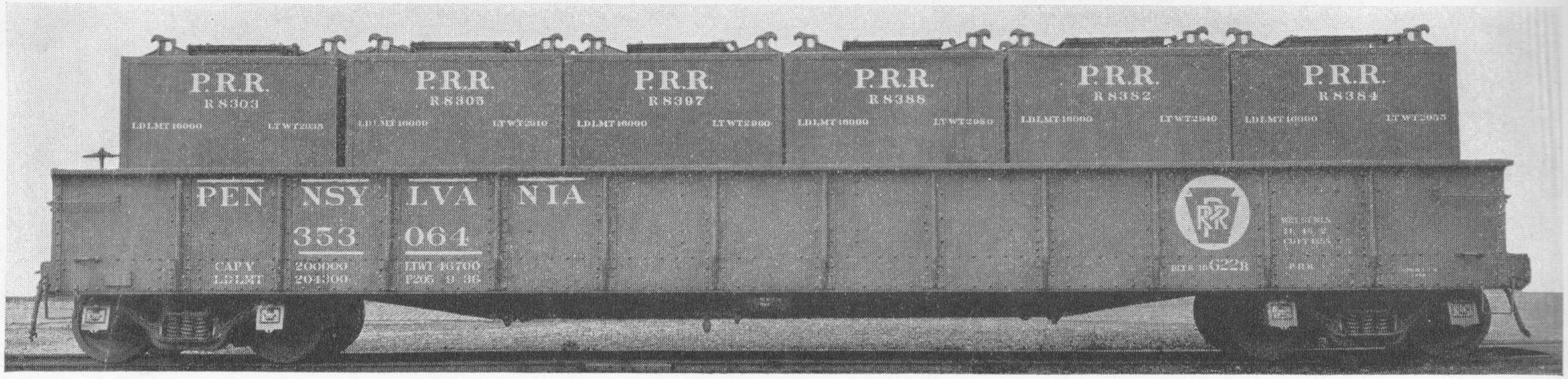


FLAT CAR

Steel frame — wood floor. For merchandise container service.

	Class F-31
Length of body	62′ 6½″
Length of car, coupled	66′ 0″
Load limit	147,200 Lbs.
Weight of car	62,800 Lbs.

8 merchandise, all-steel, weatherproof containers, Class DD-1A
Weight 2900 Lbs. — Load limit 12,000 Lbs. — Capacity 440 cu. ft.



GONDOLA CAR

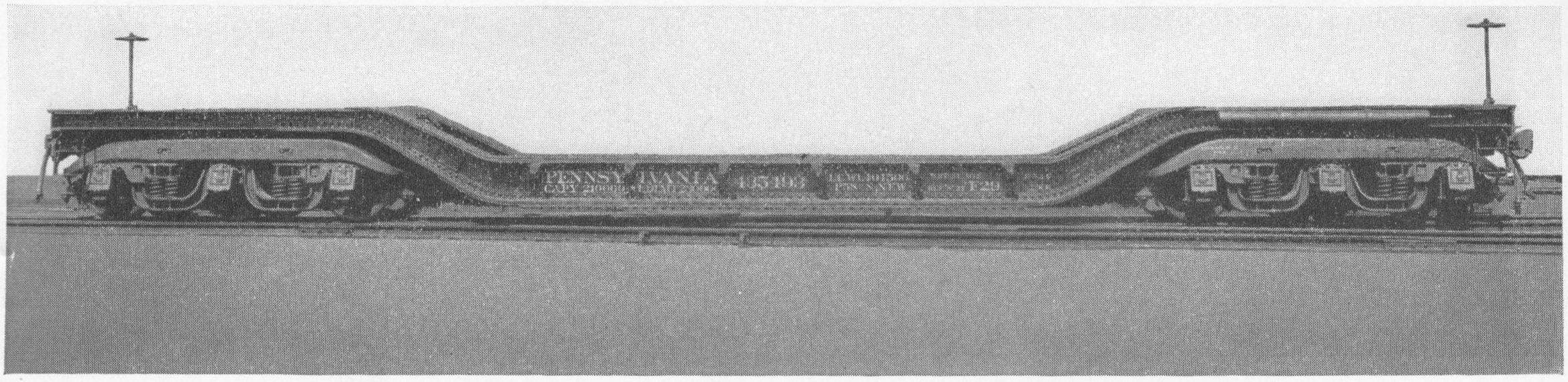
All steel.

For bulk commodity container service.

Class G-22B

Length of body, inside . . . . 46′ 2½″ Capacity . . . . . 200,000 Lbs.
Length of car, coupled . . . . 50′ 6″ Weight of car . . . . . 46,700 Lbs.

12 bulk commodity, all-steel, weatherproof containers, Class HB-1—controlled discharge.
Weight 2950 Lbs.—Load limit 16,000 Lbs.—Capacity 148 cu. ft.



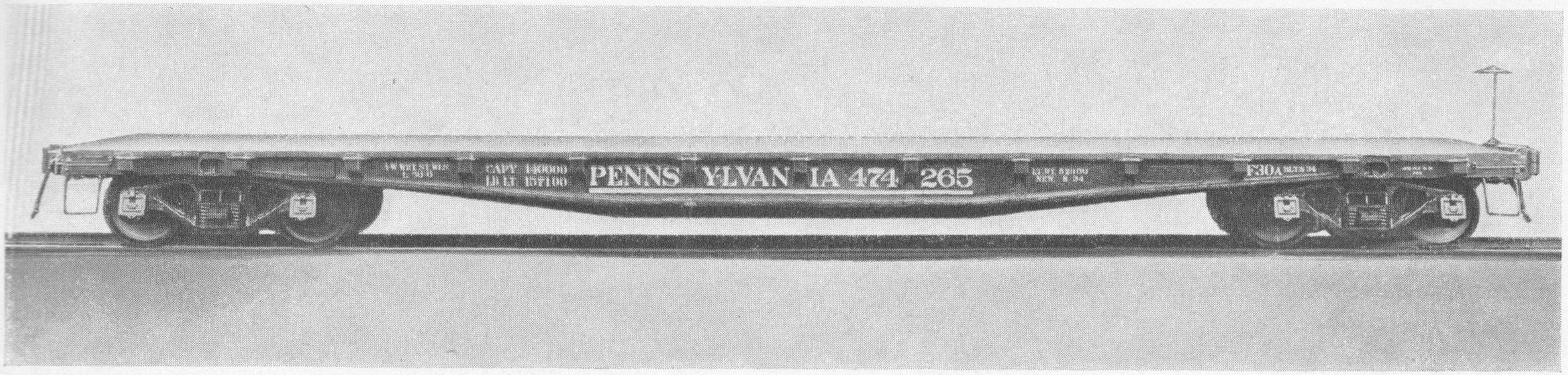
DEPRESSED FLAT CAR

All steel.

For large heavy shipments.

Class F-29

Length of body . . . . . 52′ 6″ Load limit . . . . . 230,000 Lbs.
Length of car, coupled . . . . . 55′ 0″ Weight . . . . . 101,500 Lbs.
Length of depressed floor . . . 20′ 0″ Top of rail to top of depressed floor, 2′ 3¾″

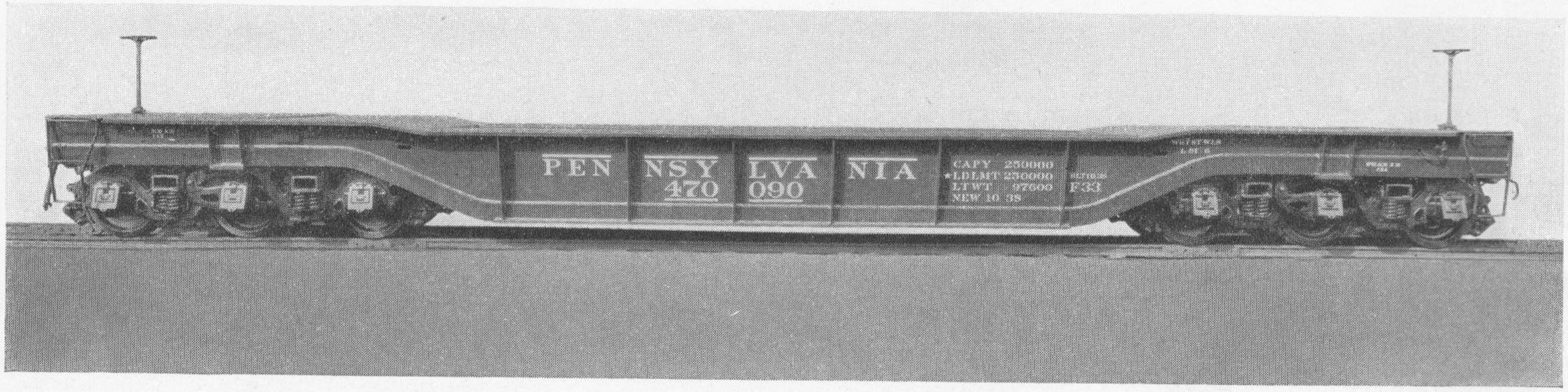


FLAT CAR

Cast steel frame — wood floor.

Class F-30A

Length of body	48′ 4″	Load limit	157,100 Lbs.
Length of car, coupled	52′ 6″	Weight	52,900 Lbs.

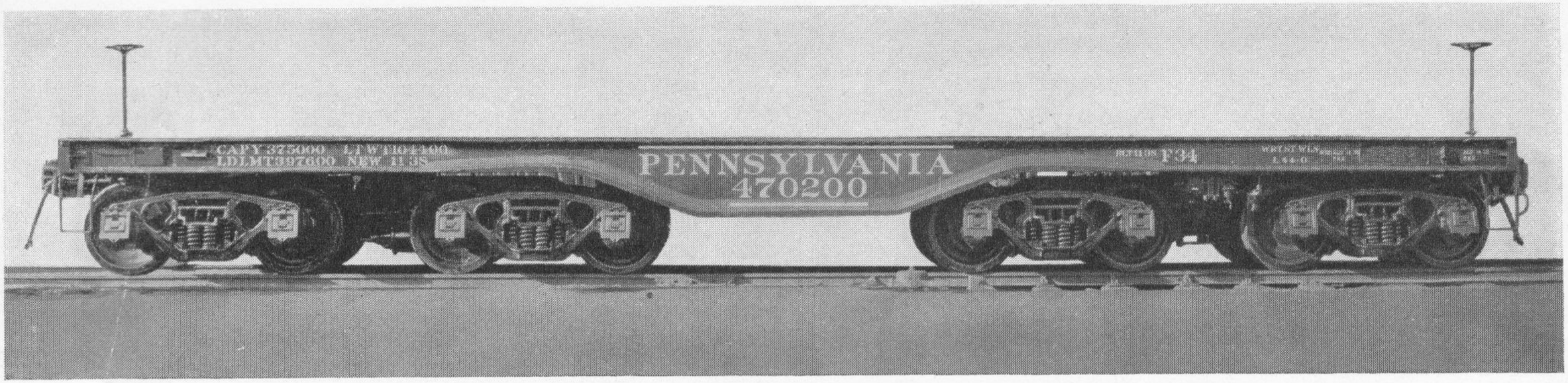


HEAVY DUTY WELL CAR

All steel — wood floor in depressed well.
For shipments of unusual size and weight.

Class F-33

Length of body	51′ 6¾″	Load limit	250,000 Lbs.
Length of car, coupled	55′ 2″	Weight	97,600 Lbs.
Length of well	25′ 2″	Top of rail to top of well floor	1′ 8″
Width of well	7′ 8″		

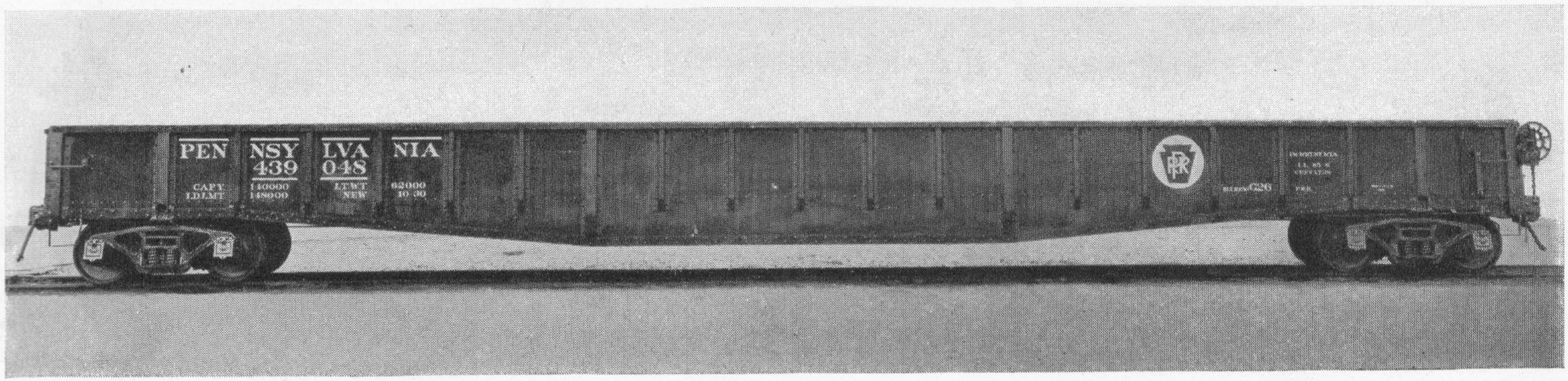


HEAVY DUTY FLAT CAR

Cast steel frame, steel floor.
For shipments of the heaviest character.

Class F-34

Length of body	44′ 0″	Load limit	397,600 Lbs.
Length of car, coupled	47′ 6¼″	Weight	104,400 Lbs.

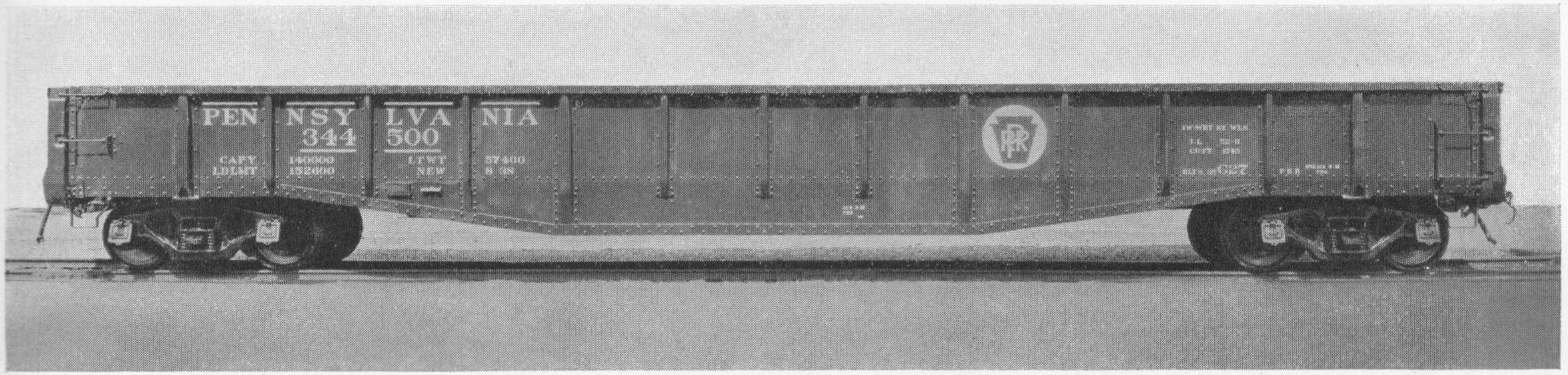


MILL TYPE GONDOLA CAR

All steel. Drop ends.
For shipments of unusual length.

Class G-26

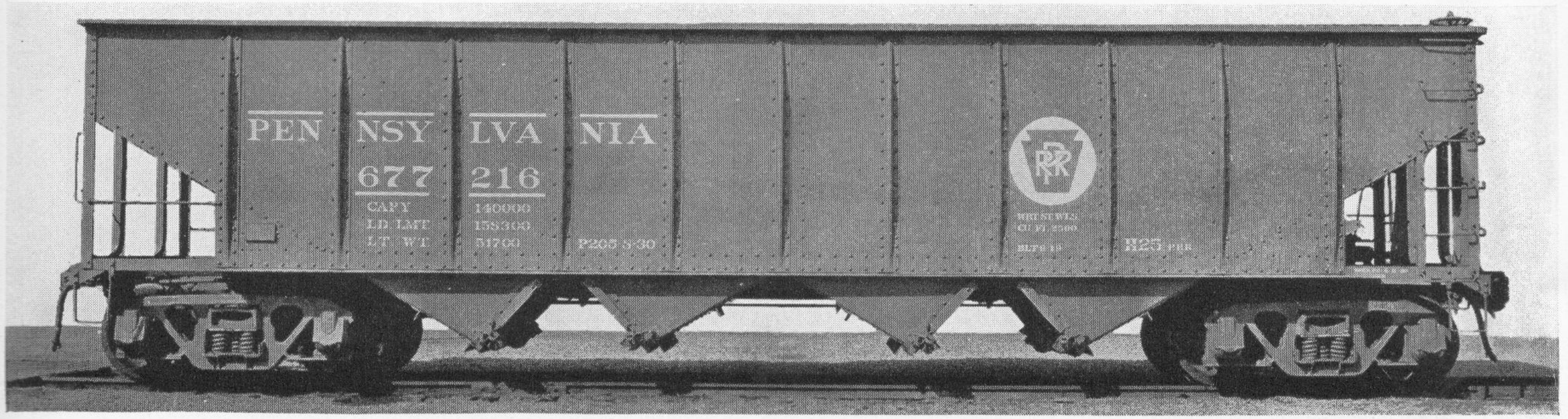
Length of body, inside	65′ 6″	Capacity	140,000 Lbs.
Length of car, coupled	70′ 3″	Weight	62,000 Lbs.



MILL TYPE GONDOLA CAR
All steel. Drop ends.
For pipe, structural shapes, etc.

Class G-27

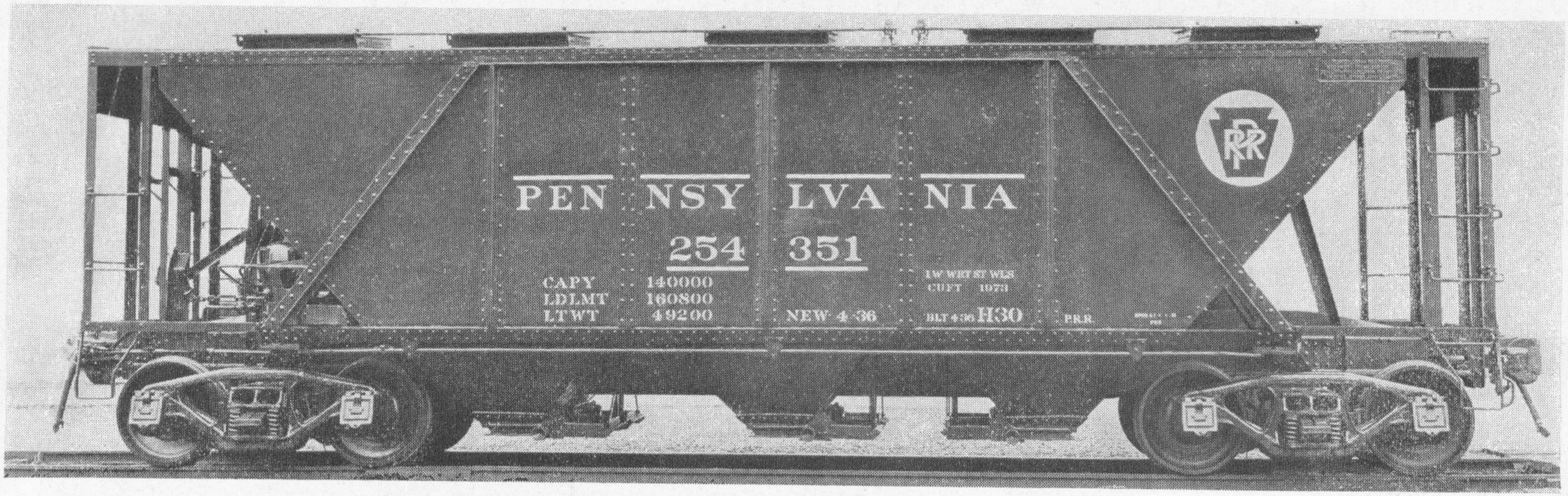
Length of body, inside	52′ 6″	Capacity	140,000 Lbs.
Length of car, coupled	57′ 3″	Weight	57,400 Lbs.



HOPPER CAR
All steel.
For coal, ore and other heavy bulk commodities.

Class H-25

Length of body, inside	40′ 2″	Capacity	140,000 Lbs.
Length of body, coupled	44′ 5½″	Weight	51,700 Lbs.

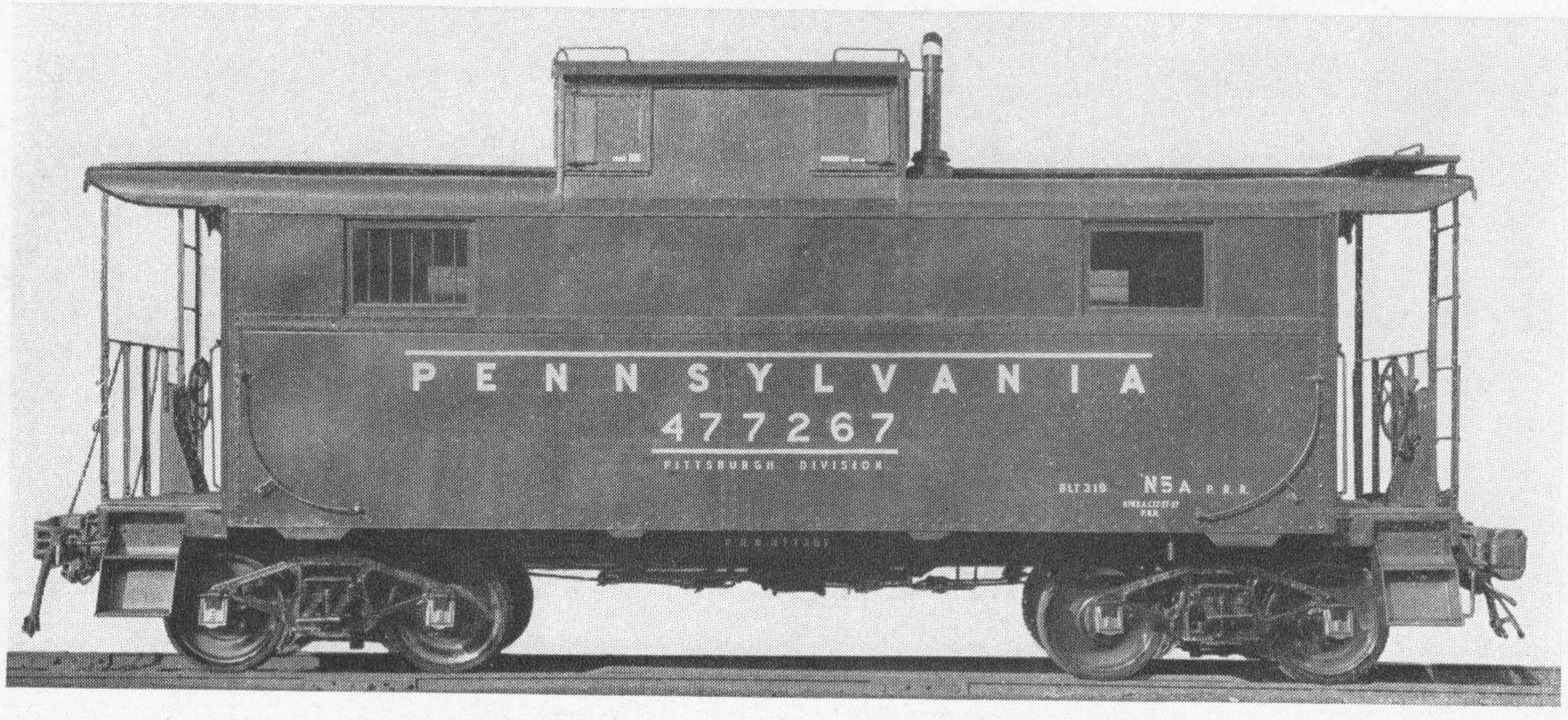


COVERED HOPPER CAR

All steel, 3 compartments, 10 roof hatches, 6 hoppers. For bulk commodities to be kept dry.

Class H-30

Length of body, inside . . . 31′ 0″
Length of car, coupled . . . 39′ 6″
Capacity . . . . . 140,000 Lbs.
Weight . . . . . 49,200 Lbs.



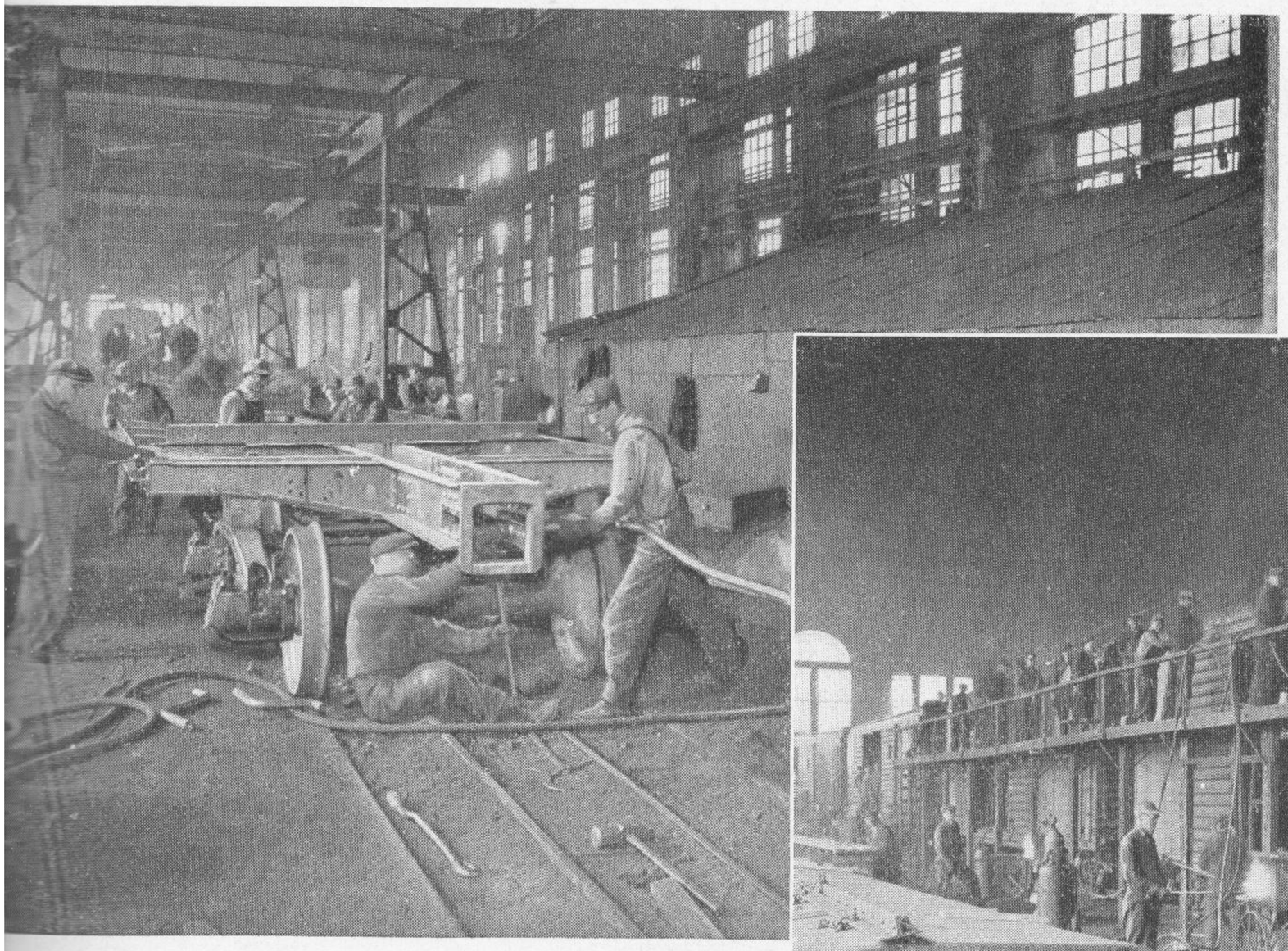
CABIN CAR

Insulated steel body.

Class N-5A

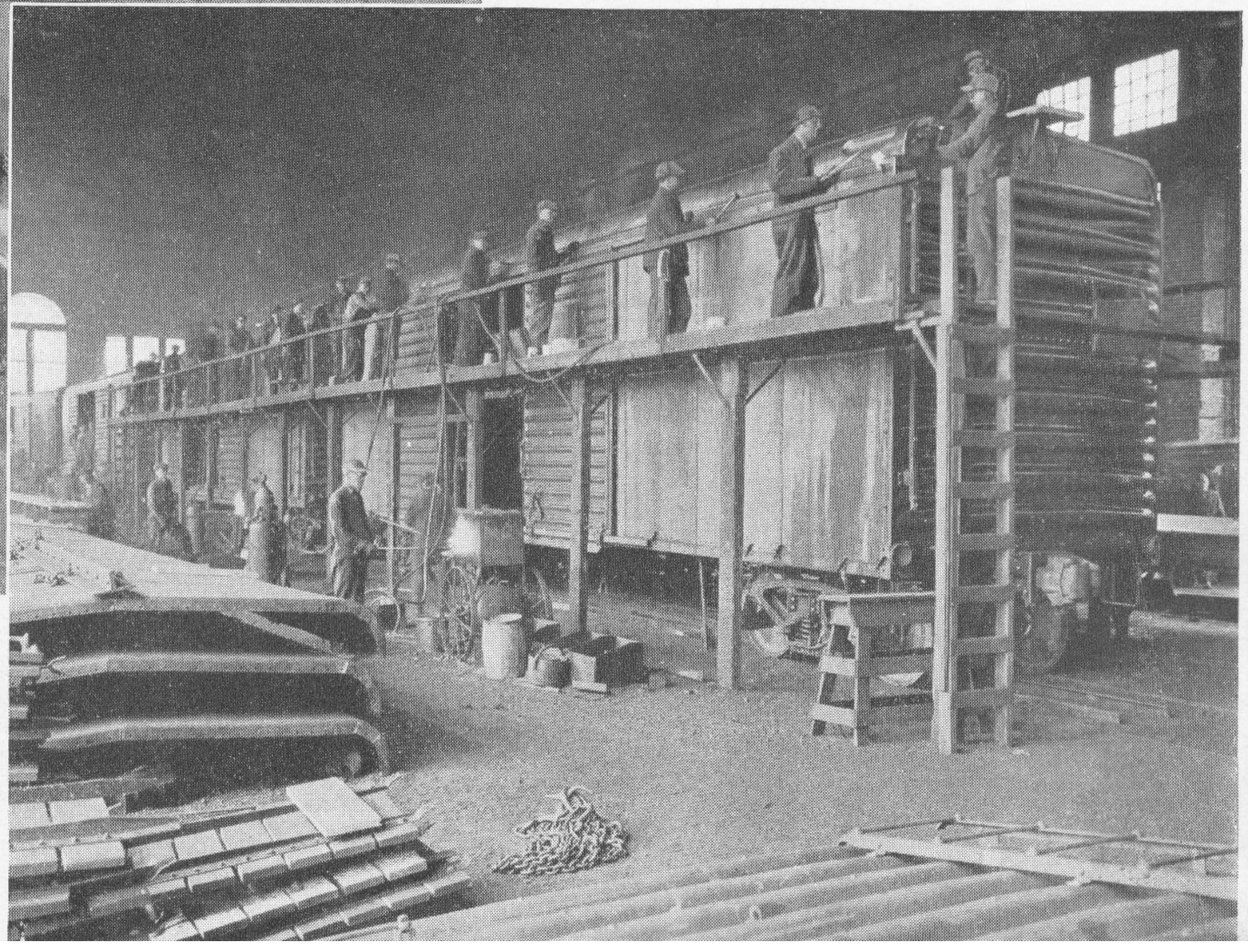
Length of body, inside . . 23′ 3¾″
Length of car, coupled . . 34′ 11½″
Weight . . . . . 45,000 Lbs.

Pennsylvania Railroad Shops where Locomotives and Cars are Built and Repaired



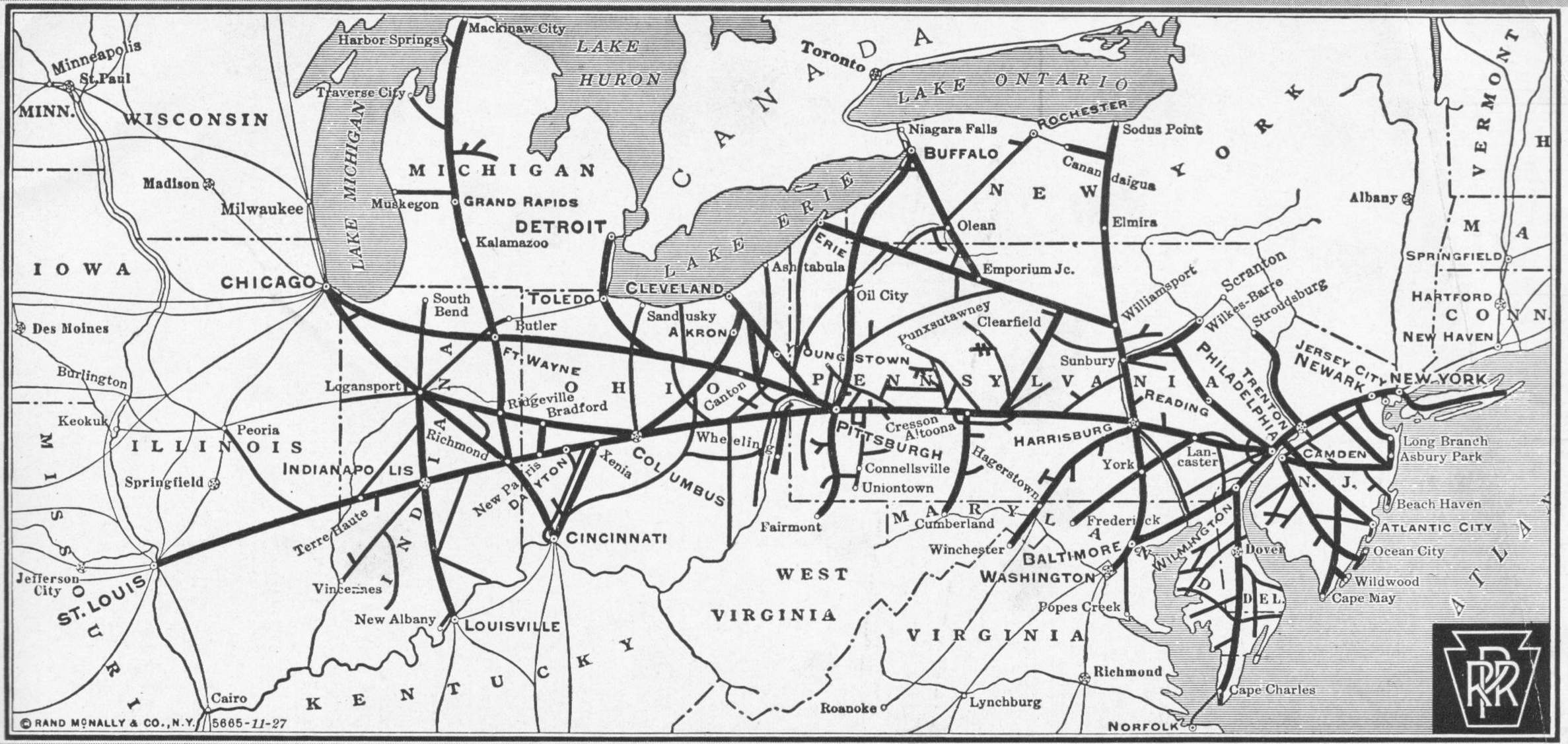
Left: Railroad cars are built on an assembly line, much as automobiles. Here the steel underframe is being fitted to the trucks.

Right: In this picture, nearly completed box cars are receiving final touches to their roofs prior to being moved out on the yard tracks.



Group of New GG-1 Streamlined Electric Locomotives Under Construction

Map of the Pennsylvania Railroad System



Connections from and to the West at Chicago and St. Louis. Through service and connecting services to and from New England and Eastern Canada at New York; to and from the South at Washington and Cincinnati.

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