

SPECIFICATIONS

GENERAL MOTORS

2000 H.P. "BOOSTER" UNIT

DIESEL - ELECTRIC

PASSENGER

LOCOMOTIVE



ELECTRO - MOTIVE DIVISION

GENERAL MOTORS CORPORATION

LA GRANGE, ILLINOIS, U. S. A.

Specification 8006
JUNE 15, 1946

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**GENERAL MOTORS
2000 H.P. "BOOSTER" UNIT
DIESEL-ELECTRIC
PASSENGER LOCOMOTIVE**

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SECTION 1

General Information and Identification

GENERAL MOTORS
LOCOMOTIVES

Model	EB-7—"Booster"—2000 Horsepower Locomotive.	
Type	A.A.R. designation (A1A-A1A). Common designation (0660).	
Arrangement	<p>The general arrangement of the locomotive is shown on Elevation and Floor Plan Drawing 8095947.</p> <p>The locomotive consists of one unit complete with two independent 1000 H.P. power plants, trucks and all necessary auxiliaries, to be operated with a "Lead" unit.</p>	
Major Dimensions	Distance, pulling face of front coupler to centerline of No. 1 truck.	13' 6"
	Distance between bolster centers.	43' 0"
	Truck—rigid wheel base.	14' 1"
	Distance, pulling face of rear coupler to centerline of No. 2 truck.	13' 6"
	Distance, pulling face front coupler to rear coupler.	70' 0"
	Width over body posts.	9' 10"
	Width over handholds.	10' 6 ⁷ / ₈ "
	Height, top of rail to top of carlines.	13' 11"
	Overall height, over exhaust stacks, maximum.	14' 3 ³ / ₄ "
Drive	Driving motors.	Four
	Driving wheels.	4 Pair
	Diameter wheels.	36"
Weights and Supplies	Total weight on drivers. (Approximately)	205,570 lbs.
	Total loaded weight on rails. (Approximately)	305,000 lbs.
	Carbody and Equipment. (Approximately)	202,100 lbs.
	Truck—Total 2.	102,900 lbs.
	Fuel.	1200 gal.
	Sand.	None
	Cooling water—Total 2 engines.	400 gal.
	Lubricating oil—Total 2 engines.	330 gal.
	Steam Generator water.	1200 gal.
Clearances	EMD Clearance Diagram 8087680 illustrates clearance conditions for Body, Truck, Motors, Running Gear and miscellaneous underneath equipment. Truck swing designed for 21° curve or 274' radius, with 2 ¹ / ₄ " free lateral motion in the truck bolster and ³ / ₈ " in Hyatt journal boxes.	
Safety Appliances	All steps, grab handles and other safety appliances cover EMD interpretation of Interstate Commerce Commission requirements.	

SECTION 2

Carbody Construction

GENERAL MOTORS
LOCOMOTIVES

- Framing** Carbody framing designed to simulate bridge construction using a modified Howe truss arrangement. The underframe has center sills joined to the side framing through cross members and side sills. The upper or roof portion is tied together with arched frames and carlines to form a turtle back roof. Ample jacking pads are provided for blocking the locomotive. Front and rear framing is arranged to provide collision protection. The complete assembly is of welded construction throughout, with reinforcing plates used at joints, placed so that no transverse welds are used.
- Hatches** Hatches designed to blend with the contour of the turtle back roof and located to provide access for removal of equipment.
- Outside Finish** The outside finish consists of paneling, mounted by use of battens, with allowance for deflection of body without buckling of panels. The finish does not assist in the support of the carbody.
- Roof sheets are welded directly to the carlines and framing.
- Flooring** Consists of plates welded to the underframe acting as a base for application of anti-skid flooring in aisles.
- Body Center Plates** Steel casting, welded to body bolster assembly. Wear plates applied to bottom and outside surfaces.
- Engine Compartment Sash** $\frac{1}{4}$ " safety plate glass. Rectangular stationary sash except front sash adjacent to Hostler's Control Station and opposite sash which swing inward.
- Gutters** Gutters are provided above doors.
- Couplers** National Malleable A.A.R. Tight Lock coupler, with heavy swivel butt.
- Draft Gear** National Malleable type M-350 rubber draft gear (*front and rear*).
- Yoke** Special EMD design.

SECTION 2

Carbody Construction



Draw Bar Carrier	Spring supported.
Uncoupling Device	Operated from both sides of locomotive.
Coupler Swing	Normal 13° swing.
Front and Rear Connections	Air brake, signal lines, and steam conduit fitted with shut-off valves.
Body End and Side Doors	Side doors are hinged type, and end doors are sliding type. The door locks are of special EMD design "L" handle, latched in horizontal position, left and right hand doors of engine room provided with a lock and Railway Coach key.
Weather Stripping	For sash—rubber of special design to provide good cushioning and water-tight assembly. For outside doors—rubberized canvas covered sponge rubber at sides, top and bottom. One extra rubber strip at bottom towards outside.
Signal Brackets	Combination flag and oil marker light brackets located at front and rear of unit. Flags and marker lights furnished by railroad.
Diaphragms	Attached to body end posts, with standard EMD face plate.
Vestibule Curtain	Standard type vestibule curtain furnished at front and rear ends. Curtain attached to right-hand post, facing end of car from outside.
Vestibule Light	Vestibule light provided at front and rear ends and operated on same circuit with engine room lights.
Foot Plate	Foot plate provided for passageway between locomotive units at front and rear ends.

SECTION 3

Trucks

GENERAL MOTORS
LOCOMOTIVES

Truck Assemblies

Two (2) six (6) wheel truck assemblies are provided per locomotive unit, interchangeable. Improved riding qualities and greater stability in negotiating curves at high speeds are obtained by an EMD design of load suspension.

Truck frame supported at four points by twin group coil springs which ride on four equalizers carried between journals. Swing bolster supported by full elliptic springs. These springs ride on each end of two spring planks, which in turn are carried by swing hangers pivoted from outside of truck frame.

Traction motors geared direct to outer axles of each truck are carried in conventional manner between the driver axles and truck transoms. Center axle is idle, and necessary for load carrying and braking purposes only.

Clean air is forced to the motors by engine-driven blowers located in engine room. Air is directed to motors through openings in bolster and body center plates, and from the bolster to the hollow truck transoms through matched openings in each. The passages between the swing bolster and transom sections are sealed by a special gasket and steel slide plate arrangement. Air passes from the transom to the motors through flexible rubber ducts, applied between motor and transom openings.

Axles

Modified E-12 with oversize wheel and gear seat and journals to suit Hyatt Roller Bearings. A.A.R. material specification M-104.

Wheels

Rolled steel heat treated, 36" diameter, 2" rim. Wheel tread ground smooth and concentric after assembly on axle.

Journal Boxes

Locomotive equipped with Hyatt Roller Bearings $6\frac{1}{2}$ " journals of special EMD design. Lateral thrust is taken through a cushioning arrangement directly by the box. Journal box pedestal guides provided with spring steel wear plate.

Truck Frame and Bolster

Steel casting, heat treated, EMD design.

Pedestals

Lined with spring steel plates bolted to frame.

Pedestal Tie Bars

Fitted and applied at the lower end of the pedestal legs, held in position by bolts.

SECTION 3

Trucks

GENERAL MOTORS
LOCOMOTIVES

Truck Center Plates Truck center plate provided with wear plates, dust guard, and lubricating arrangement.

Side Bearings Friction type side bearings.

Interlocks Body and truck interlocks provided each side of the center plate, serving as anti-sluing device in case of derailment.

Swing Hangers Made from the same kind of steel as the axles.

Bolster Springs Full elliptic.

Truck Brakes Clasp brake rigging provided on each wheel, operated by four brake cylinders per truck. Each cylinder fitted with automatic slack adjuster.

Brake Pins All pins and bushings hardened and ground, large size. All holes in brake rigging bushed.

Hand Brake Hand brake provided for the locomotive connected to one brake cylinder lever only. All trucks provided with lever for hand brake connection, making trucks interchangeable.

SECTION 4

Power Plant and Transmission



- Engine** G.M. Diesel twelve (12) cylinder, 2 cycle, bore $8\frac{1}{2}$ ", stroke 10", unit injection Roots blower scavenging through cylinder wall intake, and multi-valve exhaust. Water cooled cylinder liners and heads, oil cooled pistons, seven (7) bearing crankshaft, drop forged connecting rods, floating piston pin and bushing, and full floating piston assembly. Isochronous governor speed control and separate over-speed trip.
- Main Generator** EMD force ventilated, nominally 600 volt direct current. Single bearing direct connected to engine crankshaft through a flexible coupling. Capacity suitable to continuously transmit to traction motors the rated output of the engine under all conditions for which the locomotive is offered.
- Traction Motors** EMD direct current, series wound, roller bearings, force ventilated, axle hung motors.
- Auxiliary Generator** 10 K.W. direct current generator, provides current for control circuits, lighting, battery charging, and separate excitation of main generator. The voltage is automatically controlled by a voltage regulator.
- Load Regulator** A load regulator is provided which automatically maintains a constant horsepower output, corresponding to each throttle position, over the entire range of locomotive speeds.
- Engine Starting** By motoring of the main generator through use of special starting fields energized by the locomotive storage battery.
- Cooling System** Each engine has a separate circulation system consisting of two direct driven centrifugal water pumps; forced air circulation through fin tube radiators, and separate water supply tank. Provision made for steam jet heating of cooling water during layover periods. Temperature control by manually operated shutters.
- Engine Lubricating Oil System** Dual circulation system for each engine, consisting of a pressure pump for oil delivery to the engine lubricating system, and a separate pressure pump for oil delivery to the piston cooling system, both pumps being connected to a common supply line from the oil tank. A scavenging pump delivers oil from the engine sump through two oil coolers, a four unit waste type filter to the supply tank. Pumps are protected by strainer in the suction line. Supply tank provided with a basket strainer at the tank filler.

SECTION 4

Power Plant and Transmission



Engine Fuel System Return flow, with a single D.C. motor driven gear pump for each engine, protected by suction filter in addition to discharge filters to insure clean fuel for the engine. An assembly of sight glasses and relief valves offers visual indication of any system trouble plus protection against excessive pressures.

Engine Exhaust Dual fabricated chambers, each with independent exhaust outlets.

Fuel Tank Tank built of heavy gauge steel, with baffle plates.
Capacity 1200 gallons, located underneath the locomotive body. Filling station each side, vents equipped with flame arrestors. Double sumps with cleanout plugs and non-removable water drains located at bottom of tank.

Each fuel filling station has I.C.C. approved direct reading fuel gauge, indicating fuel level 4½" from top of tank. Tank is also supplied with a hydrostatic distant type level gauge, indicating levels to within 1" of the bottom.

I.C.C. Requirements Each filling station fitted with pull ring for emergency fuel cut-off. Similar pull cords located at operator's control station and in engine room.

Electrical Control Cabinets Cabinet for each power plant houses the locomotive high and low voltage control equipment.

- 1) High and low voltage control for Main Generator and Traction Motors.
- 2) Battery charging control.
- 3) Engine starting.

Locomotive Control Automatic forward transition of motor connections between Series, Parallel and Shunt. Backward transition is automatic between Shunt and Parallel, and manual between Parallel and Series.

Storage Battery 32 cell, 64 volt, 426 ampere hour—(8 hour rating) battery located in front end of engine room.

Hostler's Control Station Provided for individual movement of "Booster" unit around yards. Control equipment includes the following:

- a) Controller
- b) Brake valve
- c) Reverse lever
- d) Air gauge
- e) Bell
- f) Horn

SECTION 4

Power Plant and Transmission



Hostler's Control Switch Multiple button control and lighting switch located within reach of the engineer, having the branch circuits fused on the distribution panel.

- 1) Control
- 2) Generator field
- 3) Fuel pump
- 4) Gauge lights

Local Control Station A local control station for each engine located on the wall of engine room is used to individually control each engine and includes the following apparatus:

- a) Engine start and stop buttons.
- b) Isolation switch.
- c) Master air valve for electro-pneumatic throttle.
- d) Fuel pump fuse and switch.
- e) Oil pressure and engine water temperature gauges.
- f) Three signal lights.

Signal Alarm System Two alarm bells and four groups of signal lights to indicate trouble from low oil pressure, hot engine water, and steam boiler failure.

SECTION 5

Air Brakes

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- Air Brakes** Independent brake valve at Hostler's Control Station.
- Brake Piping** I.P.S. copper tubing and A.A.R. 300 lb. solder fittings except at end valves where wrought iron pipe with A.A.R. malleable iron fittings are used. All piping $\frac{5}{8}$ " O.D. and under uses nominal size copper tubing with S.A.E. tube fittings.
- Main Reservoir** Main reservoirs are carbon steel with all-welded seams and heads, capacity 20,600 cubic inches.
- Air Compressor** Each engine drives a two stage, two cylinder, air cooled direct coupled compressor having a displacement of 89.0 cu. ft. per min. at 800 RPM. Pro rata delivery in proportion to engine speed.
- Air compressor governor adjusted to provide constant main reservoir pressure with 5 to 10 lb. differential.
- Brake Cooling System** Cooling system placed between air compressor and first main reservoir.
- Sanding** None.
- Sand Capacity** None.

SECTION 6

Equipment



Warning Devices One small diaphragm type air horn at front end of unit.
One 12" locomotive bronze bell with internal ringer.

Fire Extinguishers Two (2) 1-gallon carbon tetrachloride in engine room.

Steam Generator Evaporation capacity 2250 lb. per hour.

Steam Generator Water Tank Tank built of heavy gauge steel, with baffle plates.
Capacity 1200 gallons, located underneath the locomotive body. Filling station each side with strainer. Hydrostatic remote reading level gauge.

Steam Trainline 2½" diameter, 250 lb. extra heavy fittings, one expansion joint and necessary end valves. Lagging with metal covering over trucks.

Both ends of locomotive provided with conventional steam connection.

SECTION 7

Locomotive Modifications



Gear Ratio:

Option	1	2	3	4
GEARS	52:25	55:22	56:21	57:20
RATIO	2.08	2.50	2.66	2.85
CONT. T.E.*	15,600	18,800	20,000	21,400
MAX. SPEED	117	98	92	85

*Continuous tractive effort is given per 2000 H.P. unit.
See speed-tractive effort curve.

Air Brakes:

The following combinations are available:

Lever Ratio	Brake Cylinder	Brake Shoes	Braking lb. 100#/in. ² B.C. Pres.
*6.3	10 x 10	*14" or 18"	395,900
6.3	11 x 10	18"	480,000
7.3	10 x 10	14" or 18"	458,700
†7.3	11 x 10	18"	554,500

*Supplied without E.P. brakes unless otherwise specified.
†Supplied with E.P. brakes.

Temperature Control

Automatic shutters for cooling water temperature control.

Remote Steam Generator Control

Remote steam generator control from cab.

SECTION 8

Painting



General Only the best quality materials available are used, with special attention given to both the selection of materials and methods of application to insure a maximum of protection and durability.

Engine Room Inside finished in Suede Gray Dulux, trimmed in black.
All air, fuel, water and lube oil piping color coded at points of connection.

Outside Finish Color arrangement and design to agree with Railroad's requirement. To be finished in standard lacquer finish as follows:

- a) Special primer
- b) Surfacer
- c) Knife glaze
- d) Wet-sand entire surface
- e) Spot surface
- f) Dry-sand and thoroughly clean
- g) Lacquer finish (7 to 10 coats)

Under Carriage Black Dulux unless otherwise specified.

Trucks & Tanks Black enamel unless otherwise specified.

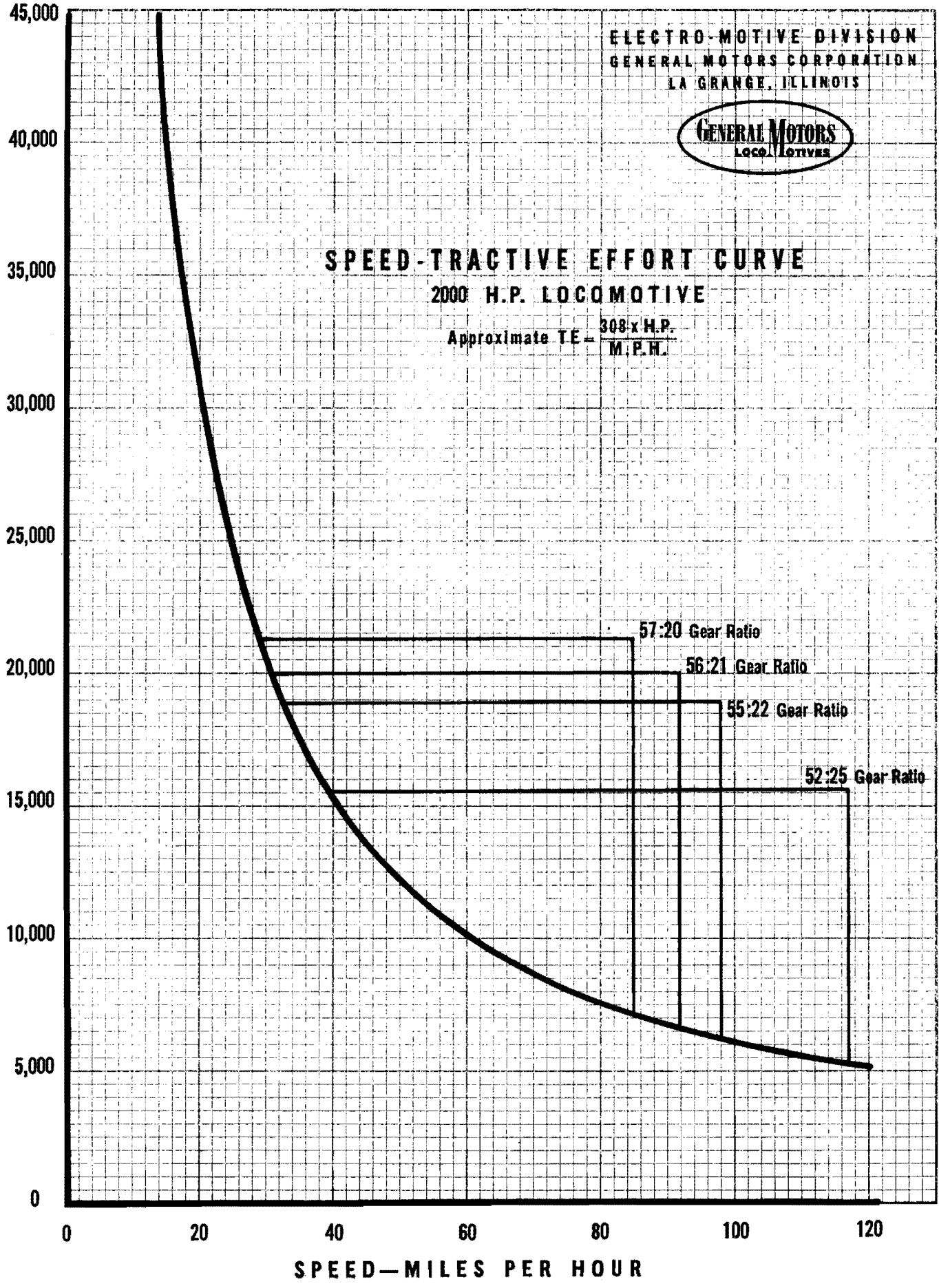
ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION
LA GRANGE, ILLINOIS



SPEED-TRACTIVE EFFORT CURVE 2000 H.P. LOCOMOTIVE

Approximate TE = $\frac{308 \times \text{H.P.}}{\text{M.P.H.}}$

TRACTIVE EFFORT—POUNDS



SECTION 10

Warranty and Patents

The logo for General Motors, featuring the words "GENERAL MOTORS" in a large, bold, serif font, with "LOCOMOTIVES" in a smaller, bold, sans-serif font underneath. The text is enclosed in an oval border.

GENERAL MOTORS
LOCOMOTIVES

Warranty:

THIS IS TO CERTIFY that we, ELECTRO-MOTIVE DIVISION, GENERAL MOTORS CORPORATION, LaGrange, Illinois, warrant all new equipment manufactured by us to be free from defects in material and workmanship under normal use and service; our obligation under this Warranty being limited to making good at our factory any part or parts thereof, which shall within one (1) year after delivery of such equipment to the original purchaser, or before such equipment has been 100,000 miles in scheduled service, whichever event shall first occur, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective.

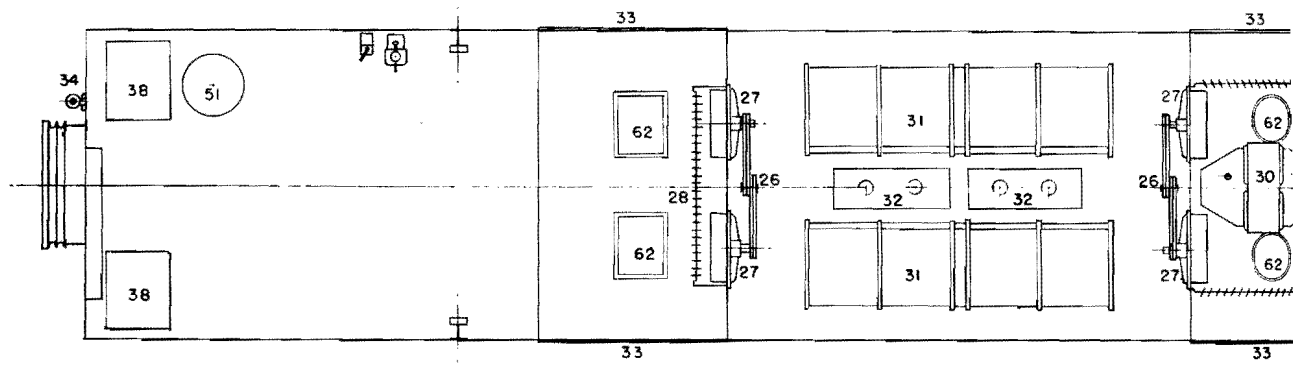
This Warranty being expressly in lieu of all other Warranties expressed or implied and of all other obligations or liabilities on our part, and we neither assume nor authorize any person to assume for us any other liability in connection with the sale of our equipment.

This Warranty shall not apply to any equipment which shall have been repaired or altered unless repaired or altered by us or by our authorized service representatives, if, in our judgment, such repairs or alterations affect the stability or reliability of the equipment, or if the equipment has been subject to misuse, negligence or accident.

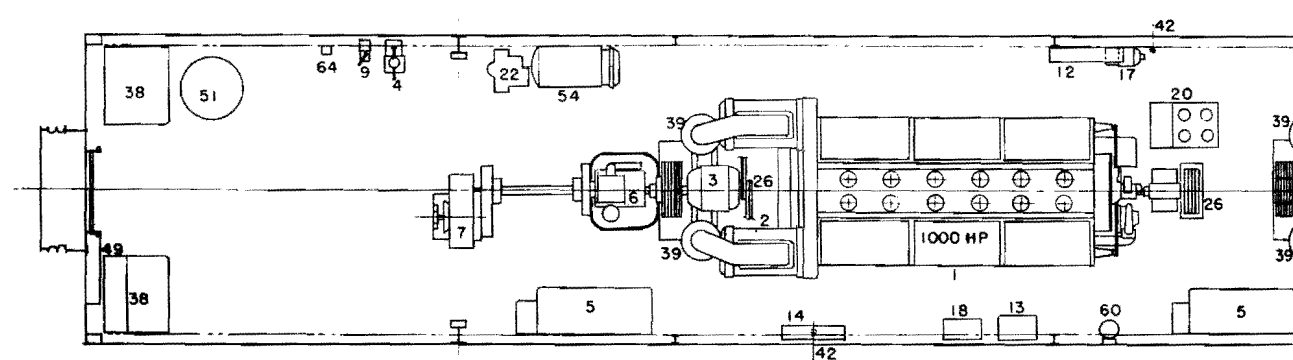
We reserve the right to make changes in design or add any improvements on equipment at any time without incurring any obligation to install same on equipment previously purchased.

Patents:

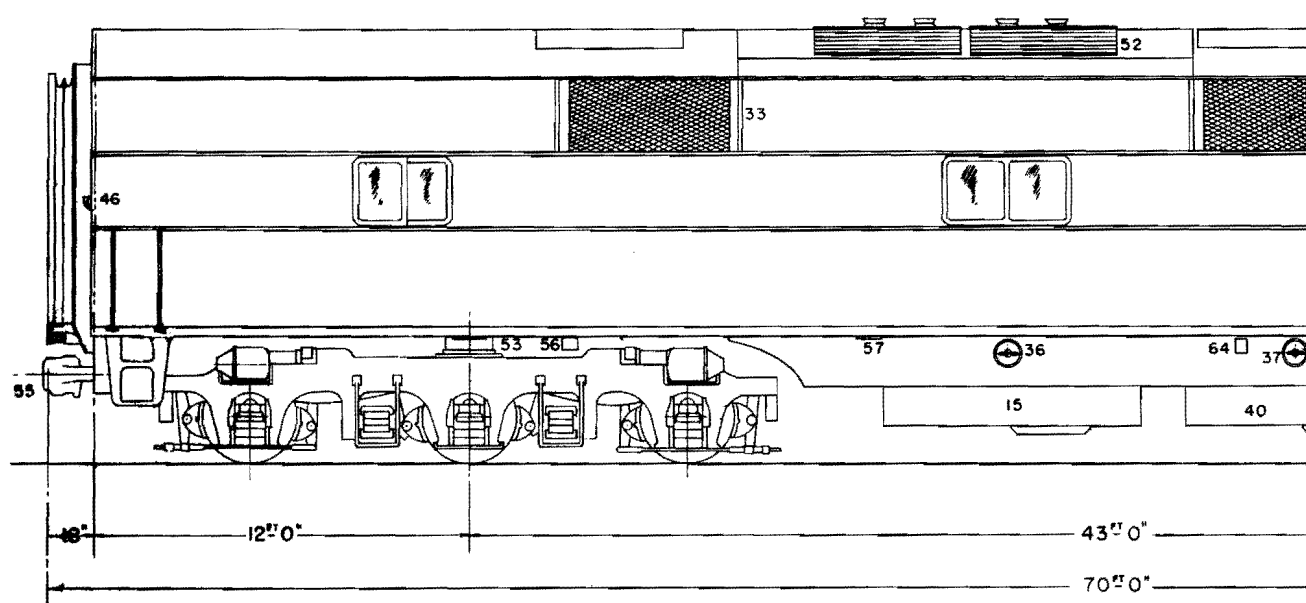
The Electro-Motive Division, General Motors Corporation, will not assume liability for patent infringement by reason of purchase, manufacture, sale, or use of devices or equipment not included in and covered by this Specification.



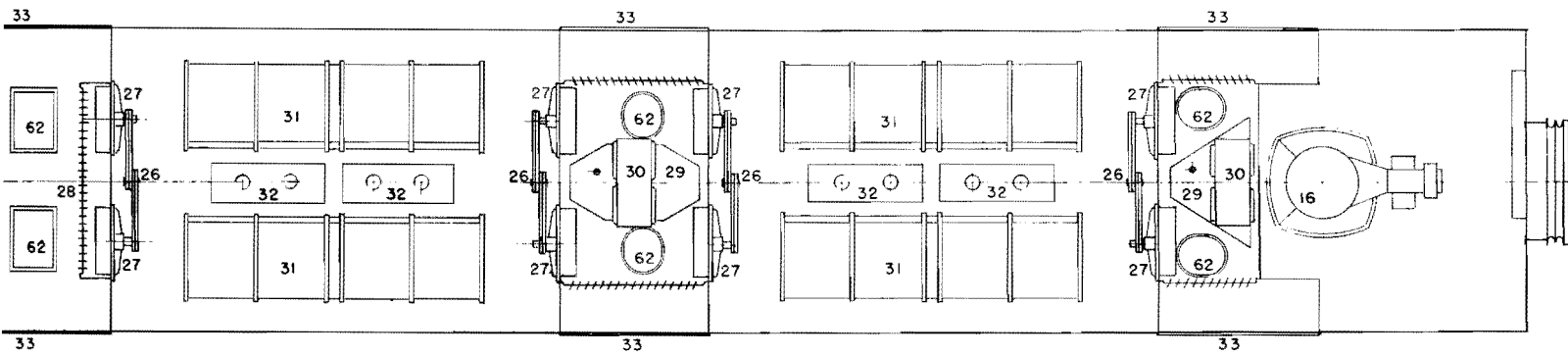
PLAN VIEW ABOVE ENG



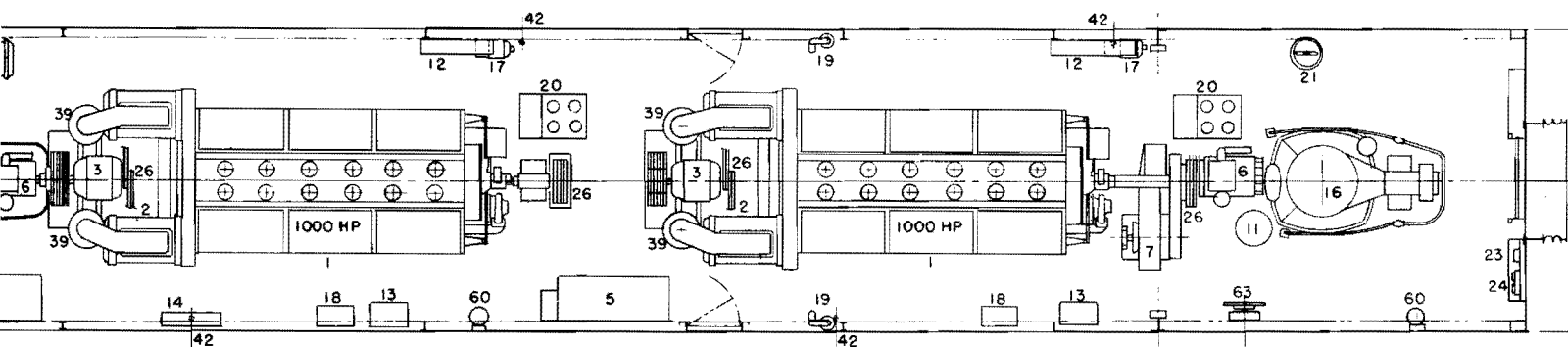
PLAN VIEW OF ENGINE



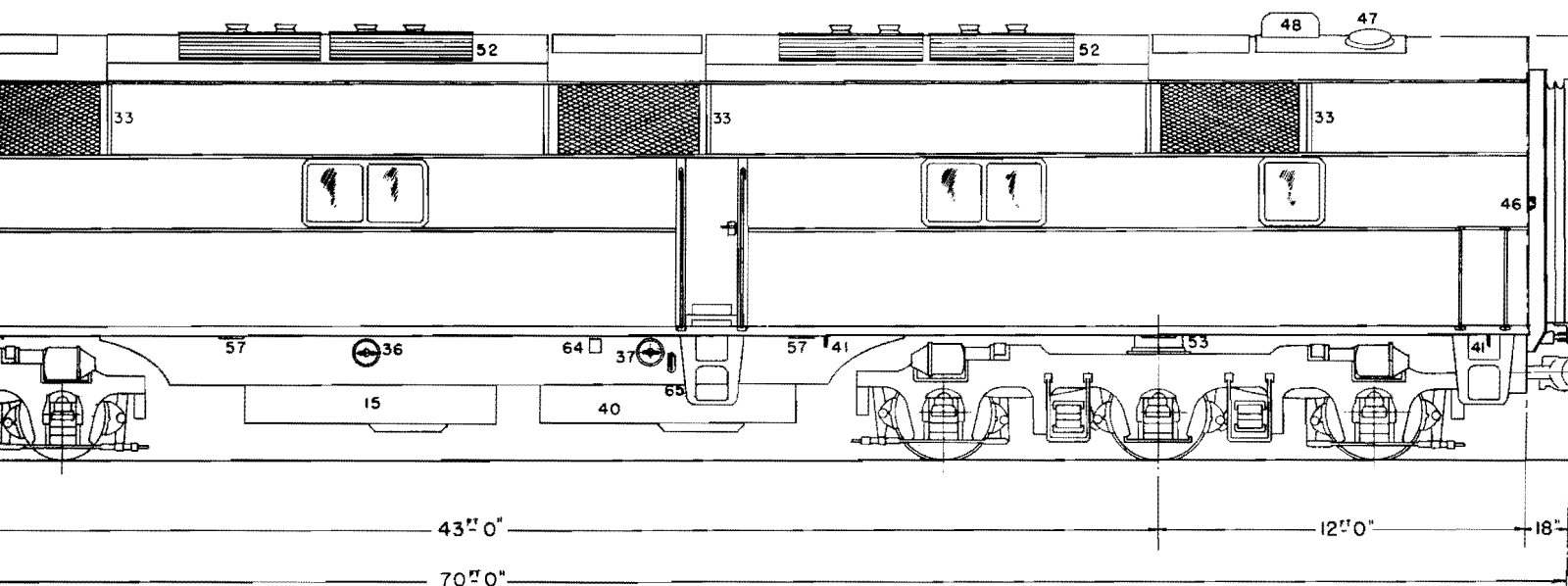
2000 H.P. MODEL EB-7 PASSENGER LOCO



PLAN VIEW ABOVE ENGINE ROOM



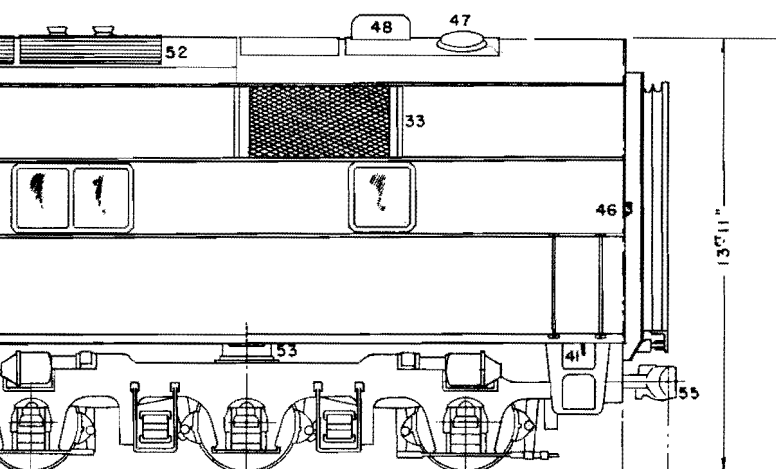
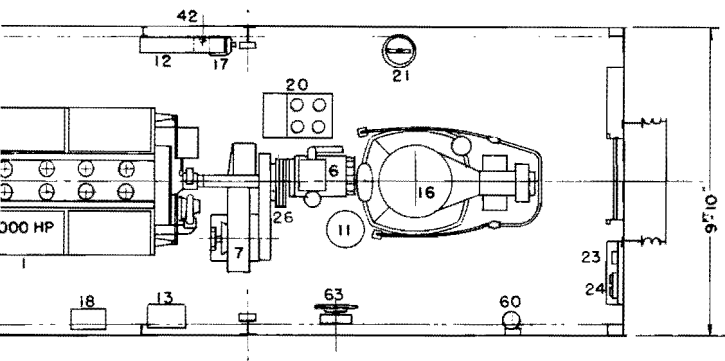
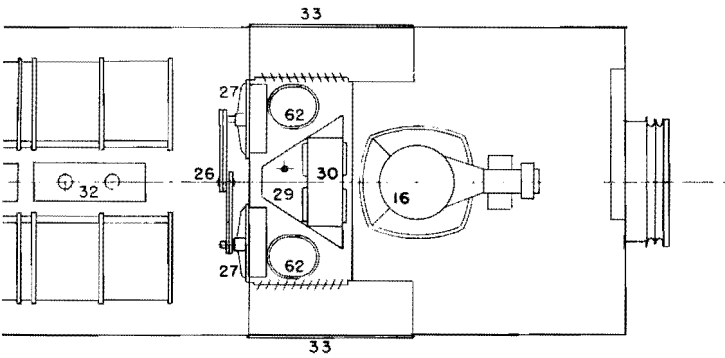
PLAN VIEW OF ENGINE ROOM



P. MODEL EB-7 PASSENGER LOCOMOTIVE "BOOSTER" UNIT

EQUIPMENT

- 1 ENGINE E.M.D. MODEL 12-567 A, 1000 HP.
- 2 MAIN GENERATOR E.M.D. MODEL D-4
- 3 AUX. GENERATOR
- 4 CONTROLLER
- 5 HIGH & LOW VOLT CABINET
- 6 AIR COMPRESSOR
- 7 TRACTION MOTOR BLOWER
- 8 SAND BOX ("A" UNIT ONLY)
- 9 AIR BRAKE VALVE
- 10 TRAIN CONTROL EQUIPMENT (WHEN REQUIRED) (ON "A" UNIT ONLY)
- 11 STEAM SEPARATOR
- 12 ENGINE CONTROL & INSTRUMENT PANEL
- 13 LOAD REGULATOR
- 14 SHUNT FIELD SERIES RESISTOR
- 15 BOILER WATER TANK
- 16 BOILER,
- 17 ENGINE FUEL PUMP
- 18 BATTERY FIELD RESISTOR
- 19 FUEL TANK VENT WITH FLAME ARRESTOR
- 20 LUB. OIL TANK & FILLER
- 21 WATER TREATMENT TANK
- 22 RELAY VALVE
- 23 BOILER CONTROL PANEL
- 24 SIGNAL LIGHTS
- 25 HOPPER (IN "A" UNIT ONLY)
- 26 FAN DRIVE
- 27 FAN, 26"
- 28 SHUTTERS
- 29 ENGINE COOLING WATER TANK
- 30 LUB. OIL COOLER
- 31 RADIATR
- 32 EXHAUST MANIFOLD
- 33 COOLING SYSTEM AIR INTAKE
- 34 HORN
- 35 SAND BOX FILLER ("A" UNIT ONLY)
- 36 BOILER WATER FILLER
- 37 FUEL FILLER
- 38 BATTERY,
- 39 ENGINE AIR INTAKE FILTER
- 40 FUEL TANK
- 41 ENGINE WATER FILLER
- 42 LUB. OIL DRAIN
- 43 CLASSIFICATION FLAG BRACKET ("A" UNIT ONLY)
- 44 BLUE FLAG BRACKET ("A" UNIT ONLY)
- 45 CLASSIFICATION LIGHT ("A" UNIT ONLY)
- 46 OIL MARKER LIGHT BRACKET
- 47 BOILER AIR INTAKE
- 48 BOILER STACK
- 49 DISTRIBUTION CABINET
- 50 EQUALIZING RES. ("A" UNIT ONLY)
- 51 MAIN AIR RESERVOIR
- 52 LOUVERS
- 53 JACKING PAD
- 54 CONTROL RES. ("A" UNIT ONLY)
- 55 COUPLER
- 56 BATTERY CHARGING RECEPTACLE
- 57 BLOCKING PAD
- 58 SANDER ("A" UNIT ONLY)
- 59 INSTRUMENT BOARD ("A" UNIT ONLY)
- 60 FIRE EXTINGUISHER
- 61 SEAT ("A" UNIT ONLY)
- 62 MAN-HOLE
- 63 HAND BRAKE
- 64 EMERGENCY FUEL CUT-OFF
- 65 FUEL LEVEL GAUGE



BOOSTER" UNIT



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